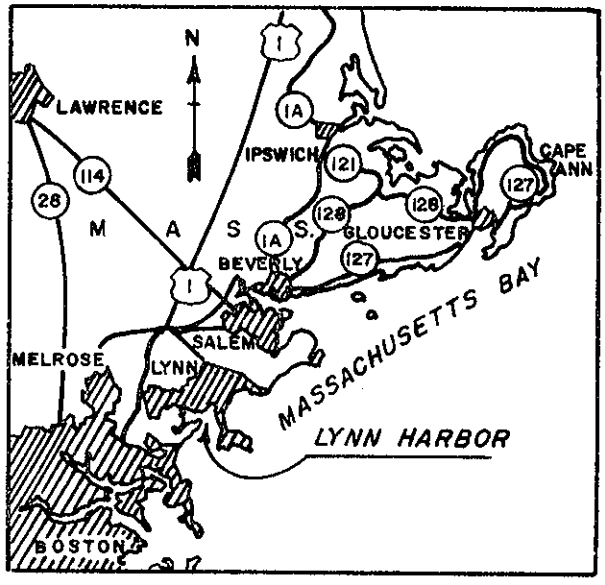
LYNN HARBOR
MASSACHUSETTS
RECONNAISSANCE REPORT

OPERATION AND MAINTENANCE

NEW ENGLAND DIVISION

AUGUST 1979

RECONNAISSANCE REPORT
OPERATION AND MAINTENANCE
LYNN HARBOR MASSACHUSETTS



U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION
424 TRAPELO ROAD
WALTHAM MASSACHUSETTS 02154

AUGUST 1979

PROJECT AUTHORIZATION

Federal interest in the development of Lynn Harbor dates back to 1882. Several studies and reviews have been conducted since that time in an effort to fully utilize the harbor's potential. A list of House Documents related to Lynn and a brief description of each is given in Appendix 1 with an indication of the action taken. The most recent study of Lynn is a General Investigation currently underway. The reconnaissance report for this investigation was submitted for approval July 6 of this year. A copy draft of this report is attached as Appendix 2. This draft is not in final form and has not yet been released for public review but should be helpful as a reference for this report.

This reconnaissance report on operation and maintenance was authorized by Section 216 of Public Law 91-611 for the purpose of reviewing the currently authorized Federal project and determining:

(a) The level of continued operation and maintenance funding justified for budgetary purposes.

(b) How well selected projects are serving authorized purposes.

(c) What other purposes are being or could be served.

(d) The need, if any, for an in depth study to establish recommendations to Congress for project modification.

This study is being done in accordance with EC 1130-2-162 and EC 1130-2-171.

PROJECT DESCRIPTION

Lynn Harbor is located 10 miles by land and 14 miles by sea north of Boston. The harbor is formed by the Nahant Peninsula on its eastern side. Access to the harbor is from the south. The harbor is approximately 3 miles long and has an average width of 1-1/2 miles. The Saugus River empties into Lynn Harbor about halfway up its western shore. The Federal project includes a channel that is authorized to a depth of 25 feet below mean low water (m.l.w.) and a width of 300 feet. The channel runs from deep water in Broad Sound along the east side of the harbor to a Federal turning basin at the head of the harbor that is currently authorized to be 550 feet wide to a depth of -25 ft. m.l.w. The project has, however, never been dredged below -22 ft. m.l.w. A flaring of the municipal channel into the Federal turning basin is also authorized but has never been accomplished. The currently authorized project at Lynn Harbor is

shown graphically on Figure #1. Photographs No. 1 and No. 2 show aerial views of the harbor; No. 1 looking SSE, No. 2 looking ESE. Photograph No. 3 shows an aerial view of the west shore of the harbor and the municipal channel.

AREA SERVED

The city of Lynn is located in Essex County on the North Shore of Massachusetts ten miles north of Boston, and is included in the Boston Standard Metropolitan Statistical Area. Its 10.48 square miles of land area are bordered on the east by 8.3 miles of Atlantic Ocean shoreline and the town of Swampscott, on the south by the city of Revere and the town of Nahant, the west by the towns of Saugus and Lynnfield, and on the north by the cities of Peabody and Salem. Those towns in the area most affected by the project are Lynn, Nahant, Revere and Saugus. Lynn is the community most directly served and therefore, most directly affected by navigation in the harbor. Lynn is looking to the redevelopment of its harbor as one of the first steps in rejuvenation of the city's economy.

Due to changes in technological and economic conditions beyond its control, Lynn has experienced a period of drastic decline in recent decades typical of many older industrial cities of the Northeastern United States. A shrinking tax base resulting from the death of the shoe industry has placed an unacceptable burden on the property taxpayer and has contributed to a steady decrease in the population, which in turn has dealt a severe blow to retail and commercial development in downtown Lynn. The obvious financial plight of the city and the associated physical decay has predictably damaged its image in the eyes of investors and has therefore become as much a cause as a symptom of the overall economic malady.

Despite the severity of the problems encountered in Lynn, the city remains optimistic that its recent planning initiatives offer a realistic opportunity for revitalization. The city remains a regional job center, primarily due to major industrial enterprises such as General Electric and Norelco. It has been tentatively selected as the site of a major commuter rail service interchange that would link the center of its retail industry to neighboring communities thus providing the necessary market expansion for future retail development.

After years of neglect and underutilization, Lynn Harbor has come to be recognized as one of Lynn's most valuable natural resources. Changes in the economy and transportation over the past three decades have resulted in the decline of the Harbor from a busy commercial port to an almost idle port limited to a few recreational and non-water related commercial and industrial uses.

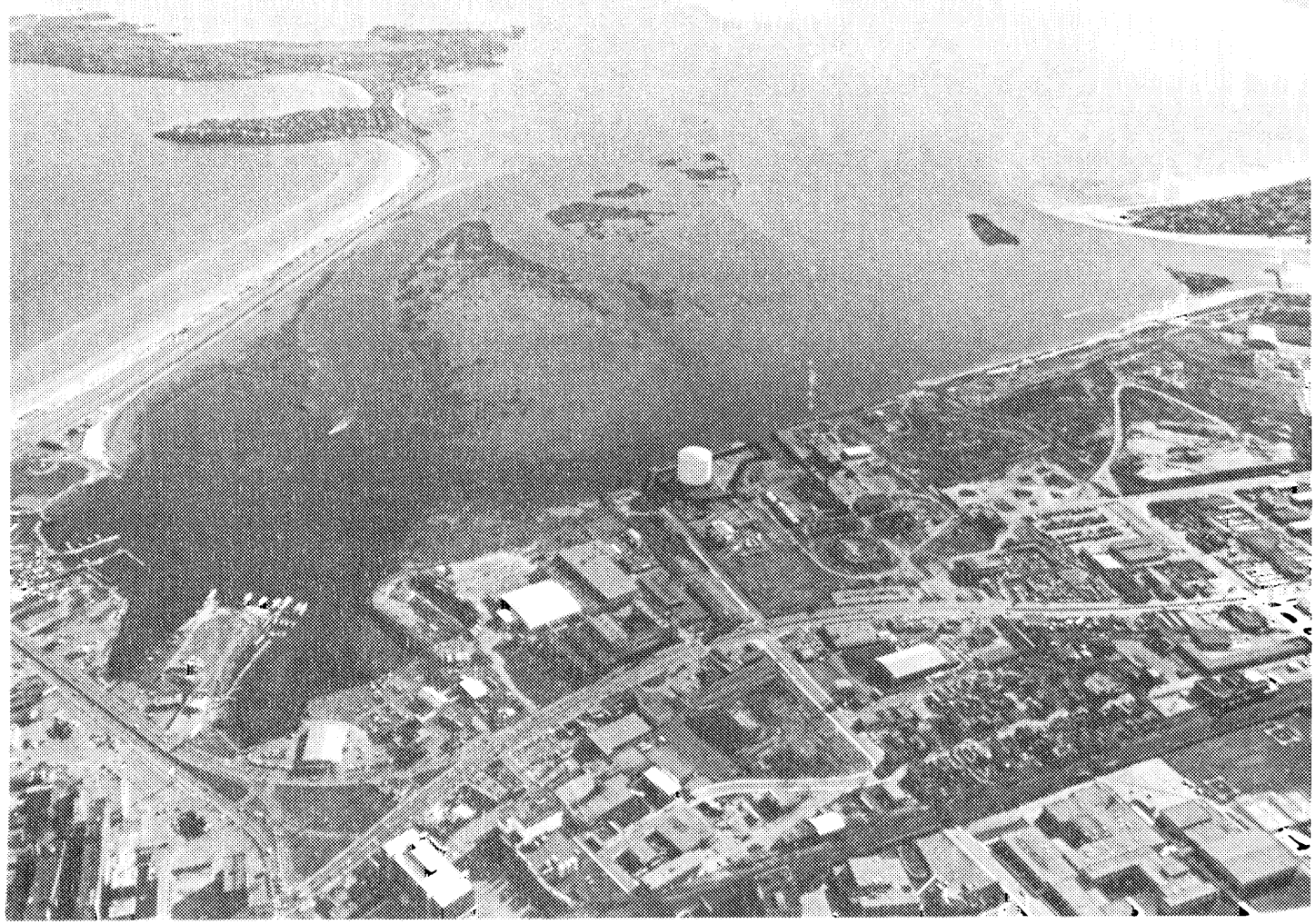
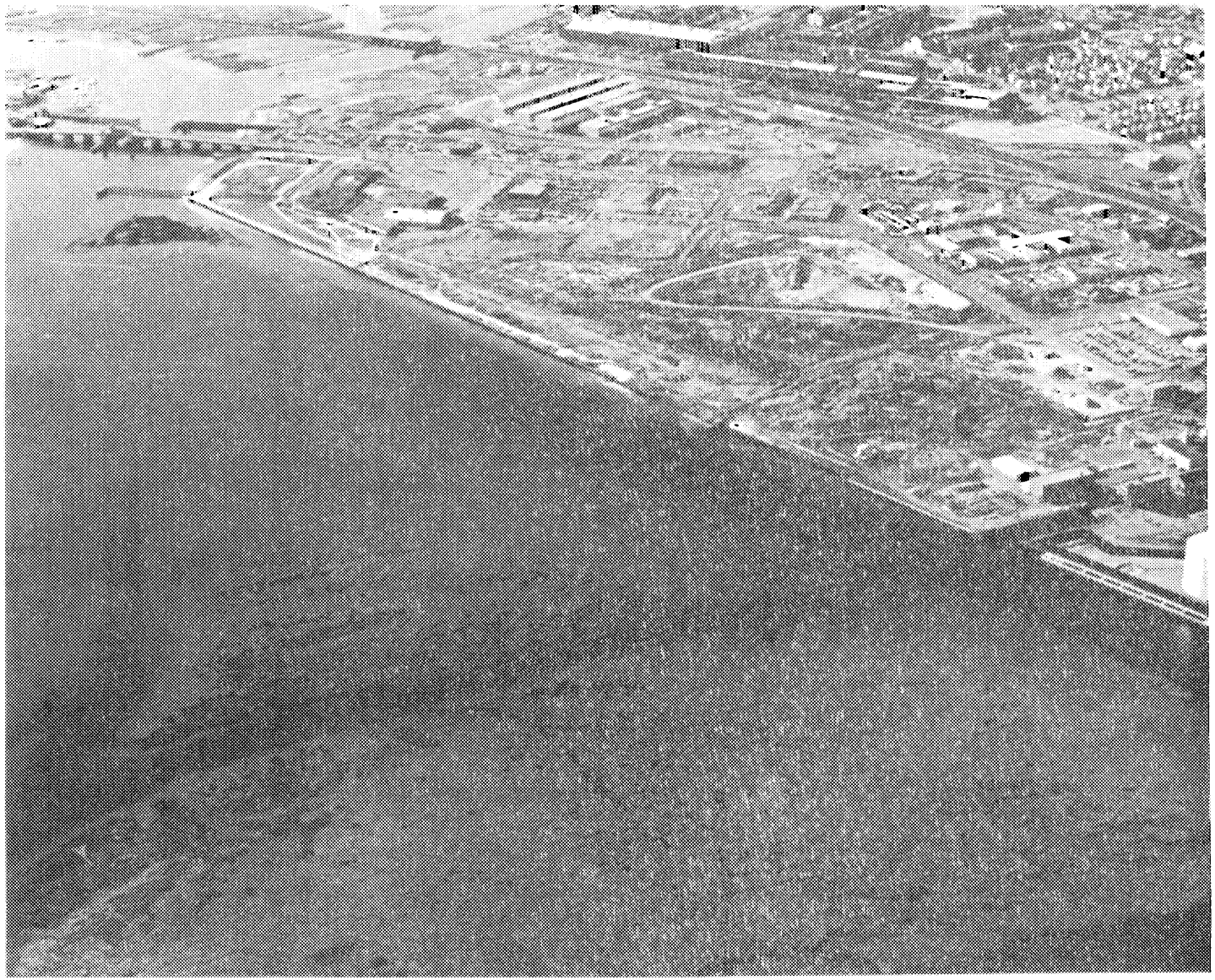


PHOTO NO. 1

PHOTO NO. 2



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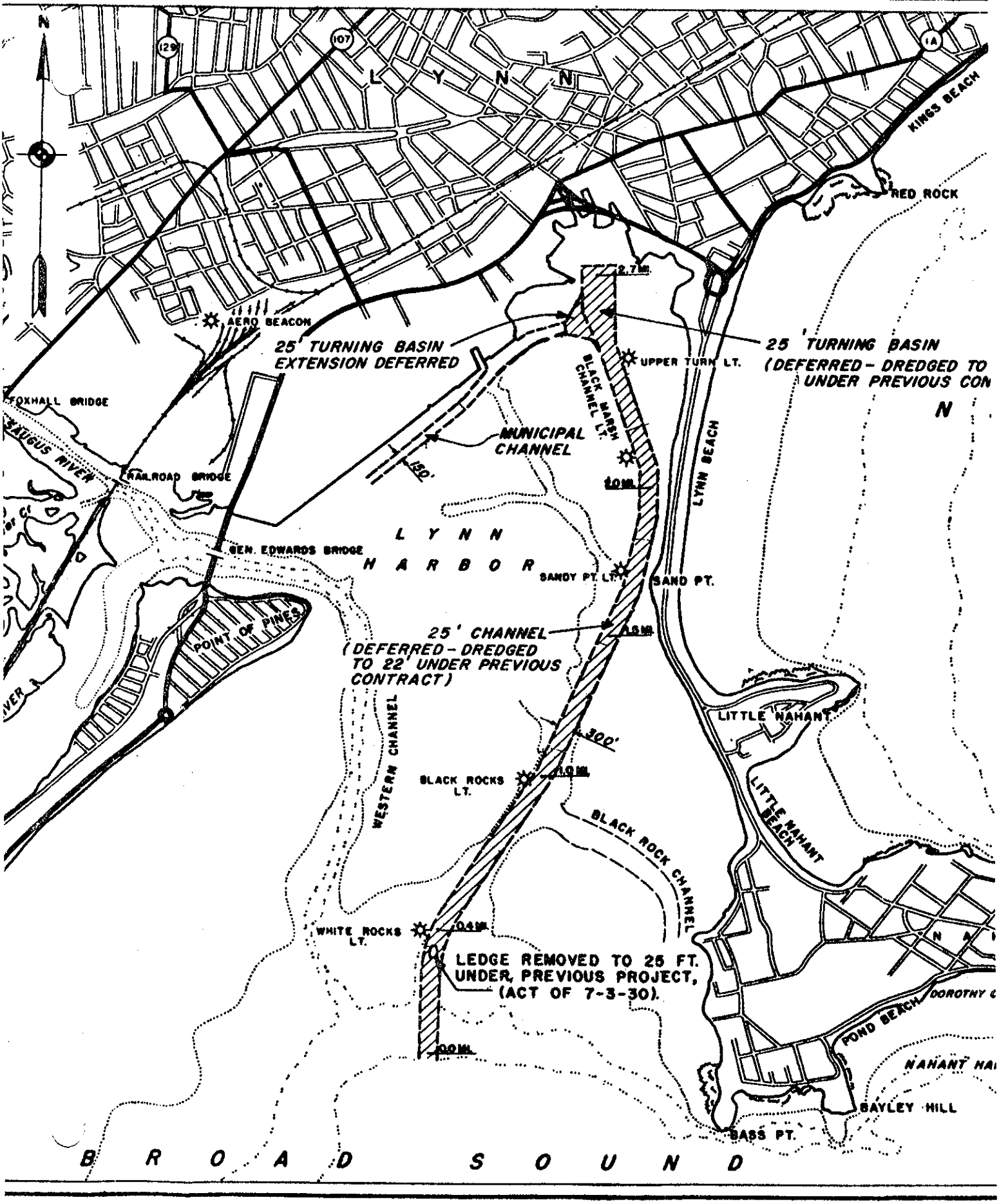

N
129
107
1A
LYNN
KINGS BEACH
RED ROCK
2.7M
AERO BEACON
25' TURNING BASIN EXTENSION DEFERRED
25' TURNING BASIN (DEFERRED - DREDGED TO UNDER PREVIOUS CON
UPPER TURN LT.
BLACK MARSH CHANNEL LT.
FOXHALL BRIDGE
SAUGUS RIVER
RAILROAD BRIDGE
MUNICIPAL CHANNEL
150'
1.0M
LYNN BEACH
GEN. EDWARDS BRIDGE
LYNN HARBOR
SANDY PT. LT.
SAND PT.
POINT OF PINES
25' CHANNEL (DEFERRED - DREDGED TO 22' UNDER PREVIOUS CONTRACT)
0.8M
LITTLE NAHANT
300'
WESTERN CHANNEL
BLACK ROCKS LT.
1.0M
LITTLE NAHANT BEACH
BLACK ROCK CHANNEL
WHITE ROCKS LT.
0.4M
LEDGE REMOVED TO 25 FT. UNDER PREVIOUS PROJECT, (ACT OF 7-3-30).
POND BEACH
DOROTHY
NAHANT HA
BAYLEY HILL
BASS PT.
BROAD SOUND

Figure 1

Several possible reasons can be cited for the failure of Lynn Harbor and the surrounding area to develop fully its potential for various maritime activities. As previously mentioned, numerous changes in technology, increased competition in the marketplace, and regional disadvantages in the costs of labor, energy, transportation, and taxation led to the death of the shoe industry, the foundation of the city's economy. The resulting shift in manufacturing activities in Lynn rendered transport activities in the harbor outmoded, and the weakening of the general economic environment prevented the revitalization necessary to maintain the harbor's commercial viability.

The harbor's close proximity to Salem and Boston may also have served as an obstacle to this development since superior port facilities had previously been developed in both those cities to satisfy the needs of the area. The shallowness of Lynn Harbor and the high cost of required dredging also proved to be a constraint against development when larger tankers and cargo-carrying vessels came into more frequent use.

The construction of the Lynnway (see Figure #3 of Appendix 2) at the advent of the trucking industry as a direct link to transport facilities in Boston provided Lynn with a seemingly desirable alternative to the costly construction of deeper channels and additional wharves and warehouses. Completion of the Lynnway was also expected to enhance industrial development along the Harbor, but a combination of poor harbor and rail facilities, high costs of construction materials and labor in the area and lack of any official aggressive industrial inducement policy prevented this expectation from being realized. Instead, a variety of commercial establishments, primarily automobile dealerships, gas stations, eating and drinking establishments, and a scattering of light industrial enterprises located on land immediately adjacent to the highway provided a barrier between the harbor area and the more active residential and commercial areas of downtown Lynn.

Current land-use in the harbor area is centered around the Lynnway rather than along the shoreline, as illustrated by Tables 8 and 9 in Appendix 1. An estimated 41.1% of the immediate shoreline is totally vacant, as is 18% of the 231.39 acres of land between the harbor and the Lynnway. Previous studies have estimated that as much as 80% of the shoreline could be considered changeable, with a wide range of commercial and industrial development possibilities.

Lynn's fine natural harbor in its present underutilized state could, if developed, provide the necessary catalytic action leading to economic revitalization. Available and suitable for a variety of industrial, commercial, and recreational uses, development of the harbor land area should serve as a stimulant to development in other

areas of Lynn. Although additional tax revenues and jobs would be generated, they would not in themselves be sufficient to cure the financial problems that the city faces or relieve the property tax burden borne by the residents. The major benefits resulting from the development of Lynn Harbor would be the creation of an atmosphere conducive to the generation of future investment in the city.

Local interests have initiated steps to begin the development of the harbor so that its full potential as a valuable natural resource may be realized and utilized. A 65 acre tract of vacant land has been obtained by eminent domain and dredging of a portion of the municipal channel is to be accomplished immediately upon approval of permit applications for this work. Funding, from the state and E.D.A. is currently available for the first stage of this dredging and construction of a new associated pier. Considerable work is being done by private developers through the Lynn Economic Development and Industrial Corporation (LEDIC) for the development of a major marine industrial park on these 65 acres of waterfront land. The action taken thus far indicates the cities full intention of completing the development begun by these recent initiatives.

The city is optomistic that this project will stimulate overall economic growth in Lynn and is looking to the Corps of Engineers for assistance in the implementation of this ambitious plan.

EXISTING CONDITIONS

Commercial activity in Lynn Harbor is currently non-existent. Recreational boating is quite active in the harbor with three marinas and two public landings supplying a total of about 200 permanent slips or moorings and adequate facilities for 150-300 day trippers. The most current condition survey of the Federal channel (December 1976) shows that in most locations the harbor has maintained its depth very well. The channel has a control elevation of approximately -17.5 m.l.w. but the average depth has remained about -22 ft. m.l.w. The turning basin has shoaled to about -17 ft. m.l.w. on the average. These depths are totally adequate for the present harbor usage of just recreational craft. However, local interests are planning the immediate development of fish processing plants to service large trawlers that draft up to 18 feet and future development of large frozen fish processing facilities that will use cargo ships drafting up to 26 feet underway. Local interests are hopeful that the dredging and pier construction mentioned previously will attract large trawlers by 1981 and larger cargo vessels by 1983. Therefore, local plans would require at least -20 ft. m.l.w. by 1981 to provide adequate depth for safe passage of large trawlers and -22 ft. m.l.w. by 1983. Since state funded municipal channel dredging is being done soon, as previously mentioned, and dredging

being studied in the General Investigation is planned for an elevation of -22 ft. m.l.w., maintenance dredging should service the area to at least the same depth. (Large cargo vessels will utilize tidal conditions to navigate the 22 ft. channel with 30 ft. being provided at the berthing areas for low tide loading of these vessels.) Maintenance dredging of the currently authorized project to the -22 ft. m.l.w. depth would require approximately 450,000 c.y. of dredging. The Corps has also recommended in the recently completed reconnaissance report for the Lynn Harbor General Investigation, that further study be done and most alternatives considered, including that one with the highest preliminary B/C ratio, include dredging of parts of the municipal channel and a large turning basin to elevation -22 ft. m.l.w. So considering the seemingly low shoaling rate, the initiatives already taken by local interests to obtain dredging and docking facilities, and the studies undertaken by the Corps for overall harbor development, maintenance dredging must be strictly evaluated.

The existing users, as previously mentioned, are solely recreational. There are potential users if the overall harbor plan, as planned by the city of Lynn, is implemented. LEDIC has identified and corresponded with many potential fishing and fish processing companies who have expressed definite interest in future expansion to Lynn.

General Electric, the area's largest employer, would like to ship preassembled turbines from Lynn Harbor without disassembling them as is currently required when shipping by truck or train. In a letter dated 11 April 1978, G.E. expressed its interest in the project and stated that potential savings in time and money were great. The actual savings will be determined in the Stage II report of the General Investigation.

Norelco has also expressed some interest in shipping and receiving from Lynn Harbor after waterfront development.

The existing conditions are not very active but the future projections paint a much better picture of harbor utilization. No hazards or obstructions exist to prohibit or hinder maintenance work in Lynn Harbor. It is open and no ledge problems exist. Access from Broad Sound is ideal and possible disposal sites are locally available.

HISTORY OF PROJECT MAINTENANCE

Lynn Harbor is rather unique in the fact that it has not been maintained by the Corps in over 35 years. The harbor was last maintenance dredged in 1940 when 124,000 cubic yards were removed at a cost of $86,000.00.

Parts of the channel development have never been completed and maintenance of the Federal channel has been hampered by the fact that local interests failed to meet local assurance requirements. Public Laws in 1930, 1935, and 1954 clearly established the legislative intent that all construction and maintenance dredging be accomplished by dredging and maintenance of the 4,800 ft. municipal channel. In 1954, the Division Engineer recommended that the portion of the municipal channel immediately adjacent to the Federal channel be flared and taken over by the Federal Government. The Board of Engineers for Rivers and Harbors made it clear at that time that local interests should still be fully responsible for that portion of the dredging that was identified previously as the municipal channel. This action reiterated the Board's position maintaining the municipal channel.

In the ongoing General Investigation, the government is considering taking over a large portion of the municipal channel and the local interests do not intend maintaining that portion of the municipal channel until the results of this study are known. Portions of the planned marine industrial park will, however, be completed before the General Investigation is finalized, and local interests have requested maintenance dredging of the existing Federal channel before the reports completion to support their independent developments. Any maintenance dredging will, therefore, require a review and alteration of the current local assurances.

ALTERNATE MAINTENANCE PLANS AND PRELIMINARY ECONOMIC EVALUATION

Benefits for this project are mainly derived from projected commercial fishing. As outlined in Appendix 2, there are also potential future recreational benefits and land enhancement benefits for Lynn but these benefits are not assured if the Corps does not favorably recommend project improvement as a result of the ongoing feasibility study. The city is taking steps, however, to develop the commercial fishing benefits regardless of the outcome of the Corps study. The question of benefits derived from commercial fishing attributed to maintenance dredging then becomes a function of the development schedule for the marine industrial park. Benefits are computed in Appendix A based on the assumption of full development of the entire project with all channels to -22 feet m.l.w. The need of the full 22 foot channel immediately is considered important by local interests since the basic economics of the local development plan depend on the use of the harbor by large trawler traffic and future use by large cargo ships transporting processed fish.

Alternative plans for future operation and maintenance for Lynn Harbor include maintenance of the Federal project to its maximum authorized depth of -25 ft. m.s.l., dredging to elevation -22 ft.

MLW to be consistent with local development plans, dredging to other higher elevations, and no dredging at all (the "no action" plan). So four basic alternatives were recognized:

1. No Action Plan - No maintenance dredging to be done by the Federal Government. This plan is a distinct possibility in light of previously discussed problems woth required local assurances. The future development of the marine industrial park will continue regardless of the Corps involvement. This fact is assured by the development agreement drawn up between the Lynn Economic Development and Industrial Corporation (LEDIC) and the park developer, America East Corporation (AEC). The agreement states:

> "In the event that State or Federal funding cannot be obtained and/or programmed to meet the Lynn Marine Industrial Park Development Schedule, LEDIC agrees to apply for all necessary permits and/or approvals so as to permit dredging to be accomplished by PARK/DEVELOPER in lieu of LEDIC to the extent necessary for essential maritime activities associated with the industrial park in which case PARK/DEVELOPER shall be entitled to a credit for such dredging costs toward the purchase price of any additional land acquired by them through LEDIC."

So maintenance dredging will be performed by private interests if not by the Corps. The first cost to the private interest will be the same but they will be financing the monies required at a higher interest rate associated with private investment. This would cause the benefit cost ratio to decrease proportionately. The comparative costs and benefits and B/C ratios for private interest and the government performing this same initial maintenance dredging is shown in Table 1. So the "No Action" alternative will be a more expensive proposal.

Another factor to be considered is the fact that if private interests dredge the Federal channel, less money may be available for land based development, thereby hampering regional development. And lastly, the practice of private interests dredging the Federal channel may not be the most desireable situation.

The possibility of locals not maintaining the channel in the event of the Corps refusal to do so does exist. This would limit the benefits associated with the project. But this possibility is not considered very likely since the projects basis is in its ability to compete with other ports and limited channel depths would virtually such possibilities as foreign trade etc.

TABLE 1

ANNUALIZED DREDGING COSTS

	Government Dredging	Private Dredging
Initial Maintenance Dredging Costs	$2,092,500 x .07131 = $149,220	$2,092,500 x .12042 = $251,980
Annual Maintenance Costs	$93,000	$93,000
Benefits	$6,417,535	$6,417,535
B/C Ratio	26.5	18.6

2. Maintaining to Elevation -25 ft. MLW - This alternative was considered and subjectively eliminated. All local development plans call for channel development to elevation -22 ft. MLW. Permit applications for dredging to be done by local interests in the near future call for -22 ft. MLW in the municipal channel. Also, in the current General Investigation being performed, channel elevations of -22 ft. MLW are being studied. An elevation of -25 ft. MLW in the existing channel is considered unnecessary.

3. Maintaining to Elevation -22 ft. MLW - This alternative would involve Federal dredging of the existing project as requested. It would require a reassessment of local assurances as discussed previously. The economics of this alternative are herein discussed assuming these assurances are properly revised.

The benefits to accrue to the harbor area are the result of development of the planned marine park. Although the full development of the marine park will not result in immediate realization of full benefits, all those benefits described in Appendix 2 will be realized at some point in the future with the availability of sufficient depth in the Federal channel.

The cost of the maintenance dredging will be approximately $2,092,500 assuming $4.65/cubic yard for dredging and computing approximately 450,000 cubic yards to be dredged if the channel is to be maintained to elevation -22 feet Mean Low Water. This depth, as explained, was used in the ongoing feasibility study for computing benefits and it is, therefore, possible to utilize the benefits previously computed in that study as a guide for computing benefits herein.

For the computation of a benefit cost ratio, the benefits attributed to the alternative plan with maximum benefits and B/C Ratio from Appendix 2 will be used. The costs will be a combination of the annual equivalent of the first cost of initial maintenance dredging amortized over the project life and an estimate of annual maintenance cost thereafter. Since the shoaling rate has been so low since the project was last dredged, a conservative annual dredging quantity of 20,000 cubic yards was used giving an annual cost of approximately $93,000.00. Therefore:

COSTS

INITIAL DREDGING = 2,092,500 x .07131 =	$149,220
ANNUAL MAINTENANCE =	93,000
TOTAL COSTS	$242,220
BENEFITS	$6,417,535.00

B/C RATIO = 6,417,535/242,220.00 = 26.5

It can be seen that even if only a small portion of projected benefits are realized, the benefit cost ratio will be very high.

If costs of other developments for the harbor under consideration in the General Investigation are included in the analysis so that all possible Federal costs are included, the benefit-cost ratio is still very high. Adding those costs associated with the optimum alternative plan identified in Appendix 2 to the costs identified above, the benefit cost ratio is:

$$\frac{6,417,535}{242,220 + 496,400} = 8.68$$

The local interests, however, already have plans in the final stages for developmemt of some shore facilities regardless of the outcome of the Corps' current feasibility study. So maintenance dredging decisions should be based only on the outcome of this study.

4. Maintenance Dredging to Elevations Between Current Elevations and -22 Ft. MLW - This alternative is associated with the possible incremental development of the marine industrial park. The elevation of -22 ft. MLW is required for very large trawlers and major cargo vessels carrying frozen fish. These vessels may not utilize the harbor immediately but will most likely utilize the harbor as development progresses. Therefore, incremental dredging to intermediate depths until such traffic is apparent may be a possibility. The park development schedule calls for total development by 1983. Dredging could be coordinated with local interest to optimize use of dredging funds available and local needs. The benefit cost ratio for this type of plan would ultimately and incrementally be similar to that for Alternative #3.

Shifting the projected utilization of Lynn Harbor to other ports is not considered feasible. Proximate fishing ports are currently overcrowded and expansion capabilities are severely limited. Recent statistics from the U.S. Dept. of Commerce have shown that the 200-mile limit and proposed expansion of utilization of

currently underutilized species will require not only expansion of present ports but new development also. Any decision to discontinue maintenance of the channel would have an adverse impact on local development initiatives and overall development of New Englnd fisheries.

Potential developments at Lynn can provide a much needed impetus to both local economy and the New England fishing industry and potential development should not be denied.

PRELIMINARY ENVIRONMENTAL ASSESSMENT

At present Lynn Harbor has a controlling depth of 17.5 ft. m.l.w. With only recreational craft using the harbor, the controlling depth is more than adequate and maintenance dredging would not be required in the forseeable future. Continued shoaling may eventually force present users to relocate. However, the city of Lynn plans to revitalize Lynn Harbor and develop waterfront facilities for industrial, commercial and recreational interests. In order to service the intended investments and development, Lynn Harbor Federal channel and turning basin would have to be dredged to 22 ft. m.l.w.

Last dredged in 1940, any future maintenance work would now require sediment analysis, benthic surveys, finfish studies, and chemical-biological testing or bioassays, depending on selection of a disposal site. Land disposal is a distinct possibility since much of the area surrounding Lynn Harbor is vacant. Since, however, the city of Lynn plans to develop some of the waterfront, final site selection would have to be coordinated with local officials. Sediment analysis would indicate if any of the material would be suitable as fill for future construction.

Should open water disposal methods be followed, two possible disposal sites are within reasonable hauling distance and will be considered: the Boston Harbor "Foul Area" (18 nautical miles) and the Boston Lightship disposal area (14.5 nautical miles). Both of these sites are outside the 3 mile limit and would be subject to evaluation under Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972. Bioassay tests would be required.

A more detailed environmental study, including an Environmental Impact Statement, is being conducted as part of the ongoing General Investigation of Navigation Improvements for Lynn Harbor. This work should be of sufficient detail to fully evaluate the environmental effects of any operation and maintenance work.

PRELIMINARY SOCIAL ASSESSMENT

The dependence of Lynn on harbor development as a stimulus for its weakening economic life has been outlined previously in this report. Lack of development, either by shifting of facilities to other areas or closing of the currently authorized project would force local interests to bear more of the financial burden of development and slow the areas hopes for revived economic life. Lack of maintenance would also cause the national economy to lose a significant input in the form of fishery resource development. The advent of the 200 mile limit and recent publications by the Department of Commerce have emphasized the importance of this resource.

Immediate maintenance of the harbor will serve as a stimulus for rapid harbor development and economic growth providing for the betterment of the general social situation in the area.

RECOMMENDATIONS

It is recommended that maintenance dredging be continued at Lynn Harbor to encourage and assist in development of the marine industrial park and overall area development. An in-depth study need not be performed in light of the General Investigation currently being performed and the high benefit-cost ratio computed above. Maintenance of the current channel is justified by recent local initiative and further Corps' involvement will be addressed in the General Investigation.

Any maintenance authorization will have to address modifications in public assurances in light of the current developments discussed above. Close coordination should be maintained with local interests and with results of the ongoing General Investigation to insure the best schedule of O&M expenditures to optimize port development and regional and Federal interests. Dredging to elevation -22 ft. MLW should be accomplished by 1983 or 1984 to allow full utilization of planned facilities.

APPENDIX 1

APPENDIX 1

HISTORY OF CORPS OF ENGINEERS STUDIES
AND REPORTS ON LYNN HARBOR'S DEVELOPMENT

Published in	Nature of Report	Work considered
Annual Report, Chief of Engineers, 1893 to 1895	Report of construction accomplished under authority of River and Harbor Act of July 13, 1892.	Channel 150 feet wide, 8 feet deep at entrance, to Western Channel leading to Saugus River.
H. Doc. No. 78, 55th Cong., 2d sess. 1900	Favorable.....	Channel 200 feet wide from sea to anchorage basin and anchorage basin 500 by 300 feet, all to depth of 15 feet at mean low water.
H. Doc. No. 948, 60th Cong., 1st sess., 1908	Favorable.....	Widening channel to 300 feet, straightening channel, and making the turning basin 500 feet square, all to depth of 15 feet at mean low water.
H. Doc. No. 1452, 63d Cong., 2d sess., 1914	Unfavorable.....	Channel 15 feet deep northerly, up Saugus River to bridge at East Saugus.
H. Doc. No. 1358, 64th Cong., 1st sess., 1918	Unfavorable.....	Dredge Eastern or Main Channel to 24 feet at mean low water.
H. Doc. No. 7., 71st Cong., 1st sess., 1929	Favorable.....	Channel 25 feet deep westerly of Bass Point, Nahant, to the head of the harbor, 300 feet wide, with a turning basin at the inner end 550 feet wide and 25 feet deep.

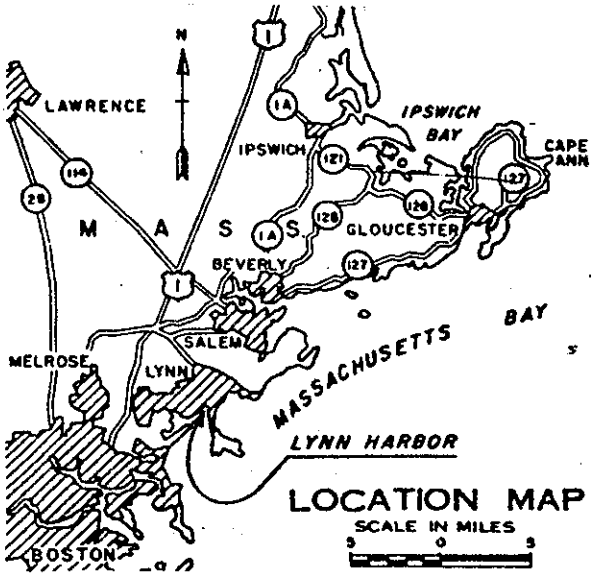
*NOTE: This document's recommendations were authorized in two steps. The River and Harbor Act (R.H.A.) of 1930 authorized a 22 ft. depth and this was accomplished when local interests completed dredging of the municipal

channel to 22 ft. The R.H.A. of 1935 authorized a 25 foot channel. Local interests, however, could not meet local assurances and the improvement was deferred and has never been accomplished.

Unpublished preliminary examination, June 6, 1947	Favorable.....	Survey to determine the extent and cost of any modification that may be found justified.
H. Doc. No. 568, 81st Cong., 2d sess., 1950	Favorable.....	Enlargement of existing turning basin by including in the Federal Project in the easterly 300 feet of the Municipal channel and by dredging this area to a depth of 25 feet below mean low water. (Deferred)

RECONNAISSANCE REPORT

LYNN HARBOR DEVELOPMENT



U.S. ARMY CORPS OF ENGINEERS

NEW ENGLAND DIVISION
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

JULY 1979

APPENDIX 2

TENTATIVE TABLE OF CONTENTS
LYNN HARBOR
RECONNAISSANCE REPORT

TABLES

JOINT AGENCIES

Chairman
New England Regional Commission
53 State Street, Suite 400
Boston, MA 02109

Executive Secretary
New England Interstate Water
Pollution Control Commission
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Boston, MA 02116

Regional Leader
Eastern Region Water Resources
Council
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Washington, DC 20037 (3)

Director
Water Resources Council
Suite 800, 2120 L Street, NW
Washington, DC 20037 (3)

Chairman
New England River Basin
Commission
55 Court Street
Boston, MA 02108 (3)

Director
Institute for Water Resources
Kingman Building
Fort Belvoir, VA 22060 (3)

Mr. Thomas Melone
A-95 Coordinator
Federal Regional Council
of New England
JFK Federal Bldg. Rm. E-431
Boston, MA 02203

FIGURES

LYNN HARBOR DEVELOPMENT
MASSACHUSETTS

SECTION I: BACKGROUND

INTRODUCTION

The development of Lynn since its founding has not been dependent on its proximity to the ocean. "Located between the two great colonial cities of Boston and Salem, both of which were noted for their harbors and world wide trade, the early citizens of Lynn chose to let their harbor remain undeveloped as long as they were prosperous in their farming and crafts. Due to a shallow harbor and lack of water power, Lynn never became a major shipbuilding and commerce center."[1] Lynn did become a major manufacturing center and made use of its harbor and land transportation routes to support its industry in importing and exporting raw materials and products.[2]

In recent years, industrial development has declined in the area and the economy has suffered significantly. In an attempt to stop the area's economic decay, Lynn is actively pursuing revitalization of its waterfront and adjacent downtown areas. Development of Lynn Harbor and associated facilities will make the vast resources of the ocean available to Lynn and will serve as a valuable impetus toward the revitalization of the area's economy.

PURPOSE AND SCOPE

The purpose of the study is to determine if Federal participation in navigation improvements for Lynn Harbor is advisable at this time. The improvements to be considered would be in support of the city's proposal to develop its harbor and waterfront. The study will review the project history; outline the study process and objectives; establish base conditions for environmental, economic, cultural, and social impacts; discuss community needs; estimate general project costs and benefits; and determine if further study is warranted. If further study is recommended, the method and direction of these studies will be outlined.

[1] John Brown Assoc. Comprehensive Open Space and Recreation Plan, Lynn Mass., Feb. 1973, pp 1-2

[2] Interim Report on Lynn, MIT Sea Grant, Sept 1976

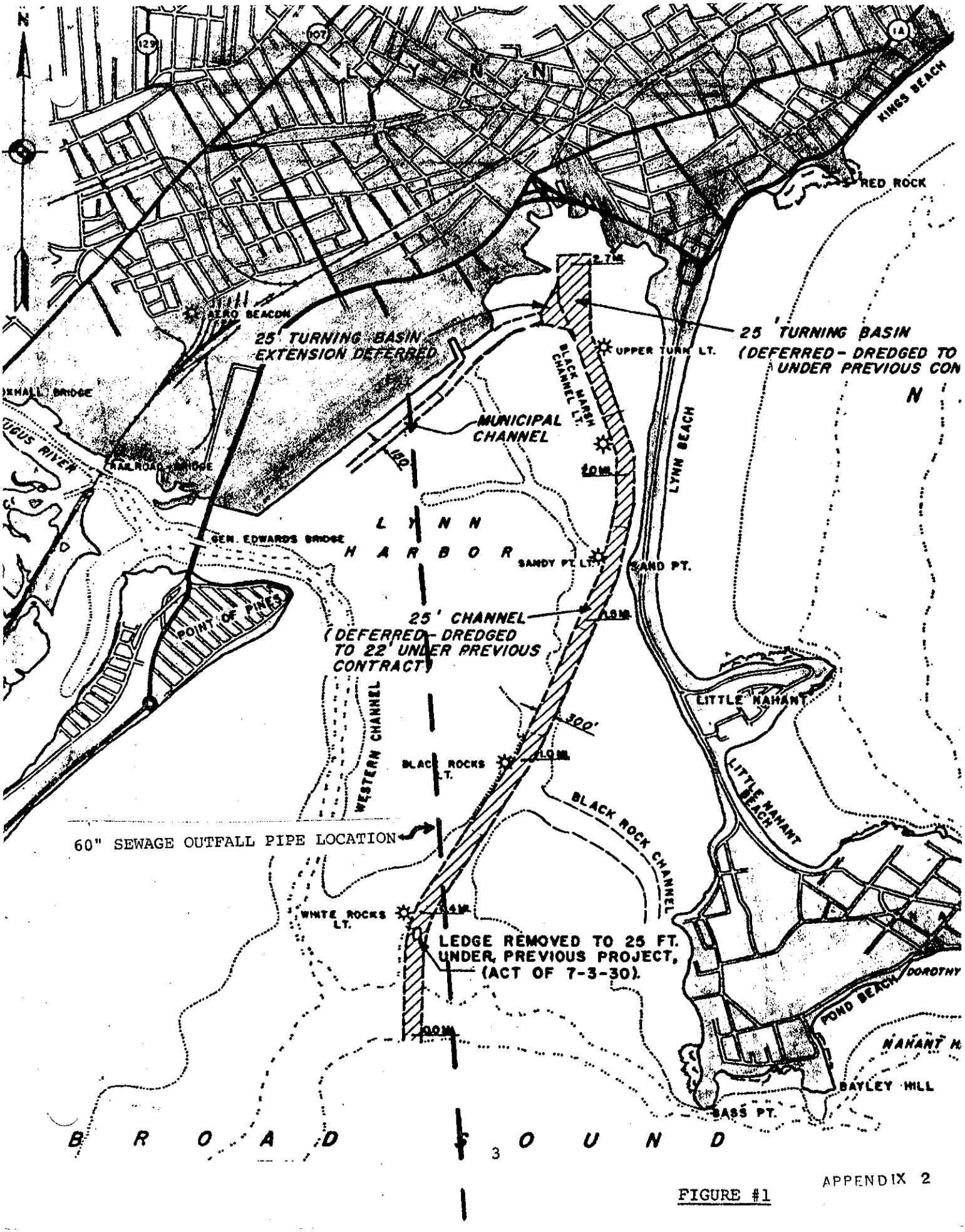
STUDY AUTHORITY AND HISTORY

The study is being accomplished under two Congressional Resolutions dated 7 July 1972 and 12 October 1972. These resolutions read as follows:

> "RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE UNITED STATES SENATE, That the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act, approved 13 June 1902, be and is hereby, requested to review the report of the Chief of Engineers on Lynn Harbor, Massachusetts, contained in House Document Number 568, Eighty-first Congress, and other pertinent reports, with a view to determining the advisability of any modifications of the existing project at this time."

> "RESOLVED BY THE COMMITTEE ON PUBLIC WORKS OF THE HOUSE OF REPRESENTATIVES, UNITED STATES, That the Board of Engineers for Rivers and Harbors is hereby requested to review the report of the Chief of Engineers on Lynn Harbor, Massachusetts, contained in House Document Number 568, 81st Congress, and other pertinent reports, with a view to determining the advisability of any modification of the existing project at this time."

In 1973, a study was begun to determine the feasibility of providing a deep draft channel in Lynn Harbor for the delivery of oil to to a proposed power plant on the Lynn waterfront. Other commerce on the waterway would have included shipment of turbines from the General Electric plant. The study was deferred in 1974 when the plans to build the power plant were cancelled. The local interests requested that the study be placed in a deferred category; thus facilitating resumption of a study of harbor development if other uses could be identified and developed. The city council has recently approved a detailed plan outlining the development of a marine industrial park encompassing fish processing, ship repair, frozen seafood processing, and recreational boating. Parks and public access development are also included in the plan. This plan would call for Federal assistance in dredging a 22-foot channel and constructing a breakwater for harbor protection. The city also considered a containerport plan proposed by the Boston Shipping Association (B.S.A.). This plan called for development of a 40 foot channel for handling a deep draft ocean-going vessel carrying containerized cargo. The city decided to pursue the marine park plan and has initiated condemnation proceedings on 65 acres of land required for the park. State and Economic Development Agency funds are currently available for the dredging of portions of the municipal channel (see Fig. 1) and construction of one pier upon acquisition of these 65 acres and issuance of the proper permits.



APPENDIX 2

FIGURE #1

PRIOR REPORTS

Federal interests in the improvement and development of Lynn Harbor extends back to 1882. The following is a list of reports on which the present Lynn Harbor project is based.

Published in	Nature of report	Work considered
Annual Report, Chief of Engineers, 1893 to 1895	Report of construction accomplished under authority of River and Harbor Act of July 13, 1892.	Channel 150 feet wide, 8 feet deep at entrance, to Western Channel leading to Saugus River.
H. Doc. No. 78, 55th Cong., 2d sess. 1900	Favorable.....	Channel 200 feet wide from sea to anchorage basin and anchorage basin 500 by 300 feet, all to depth of 15 feet at mean low water.
H. Doc. No. 948, 60th Cong., 1st sess., 1908	Favorable.....	Widening channel to 300 feet, straightening channel, and making the turning basin 500 feet square, all to depth of 15 feet at mean low water.
H. Doc. No. 1452, 63d Cong., 2d sess., 1914	Unfavorable.....	Channel 15 feet deep northerly, up Saugus River to bridge at East Saugus.
H. Doc. No. 1358, 64th Cong., 1st sess., 1918	Unfavorable.....	Dredge Eastern or Main Channel to 24 feet at mean low water.
H. Doc. No. 7, 71st Cong., 1st sess., 1929	Favorable.....	Channel 25 feet deep westerly of Bass Point, Nahant, to the head of the harbor, 300 feet wide, with a turning basin at the inner end 550 feet wide and 25 feet deep.

NOTE: This document's recommendations were authorized in two steps. The River and Harbor Act (R.H.A.) of

1930 authorized a 22 ft. depth and this was accomplished when local interests completed dredging of the municipal channel to 22 feet. The R.H.A. of 1935 authorized a 25 foot channel. Local interests, however, did not meet local assurances and the improvement was deferred and never accomplished.

Unpublished preliminary examination, June 6, 1947	Favorable.....	Survey to determine the extent and cost of any modification that may be found justified.
H. Doc. No. 568, 81st Cong., 2d sess., 1950	Favorable.....	Enlargement of existing turning basin by including in the Federal Project in the easterly 300 feet of the Municipal channel and by dredging this area to a depth of 25 feet below mean low water. (Deferred).

The following table lists the reports done on Lynn and Lynn Harbor by non-Corps of Engineers interests, including local, State, other Federal, and educational agencies.

Title	Prepared by	Date Released	Prepared for
Economic Base Study	Lynn Planning Department	November 1973	City of Lynn
Housing Study	Lynn Planning Department	January 1975	City of Lynn
Population Study	Lynn Planning Department	January 1975	City of Lynn
Social Characteristics	Lynn Planning Department	March 1975	City of Lynn
North Shore Transit Project Alternative Sites Report:	Grenier Engineering Sciences, Inc. Gladstone Assoc.	December 1977	Massachusetts Bay Transit
Lynn Central Square	Charles G. Hilgenhurst & Assoc.		

Downtown/Waterfront Revitalization Program	Sasaki, Assoc., Inc. Urban Consulting Assoc. of Boston, Inc.	1978	City of Lynn
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STUDY PARTICIPANTS AND COORDINATION

The study will be accomplished by the Corps of Engineers. Throughout the study close coordination will be maintained with the officials, agencies, and public interest groups of Lynn. Also timely and proper coordination will be done with State and Federal agencies. Realizing that surrounding communities are also interested in developments which may affect them, coordination will be maintained with them in the study process from beginning to end.

Information exchange and coordination will be accomplished through workshops, mailings, formal public meetings, and distribution of reports as needed to maintain an effective public involvement program in this area. The Lynn Planning Department has participated in developing the mailing list and is expected to continue to provide assistance. An announcement of study initiation was mailed in October 1977 to all known interested or affected parties. This announcement and its mailing list is included in Appendix 1. A workshop was held in Lynn during December 1977, with the participation of surrounding communities and state agencies. The workshop informed all of the study process and of Lynn's development proposals. Appendix 2 includes a copy of the announcement of completion of this Reconniassance Report and the mailing list used for dissemination.

Coordination with the U.S. Fish and Wildlife Service has resulted in their input to this Reconnaissance Report. Further contacts with them will continue throughout the entire study. A letter detailing their advice and recommendations is in Appendix 3. The Division of Waterways of the Massachusetts Department of Environmental Quality Engineering has been contacted and will be an active participant in the harbor development using state and other Federal monies to provide related waterfront structures and channels.

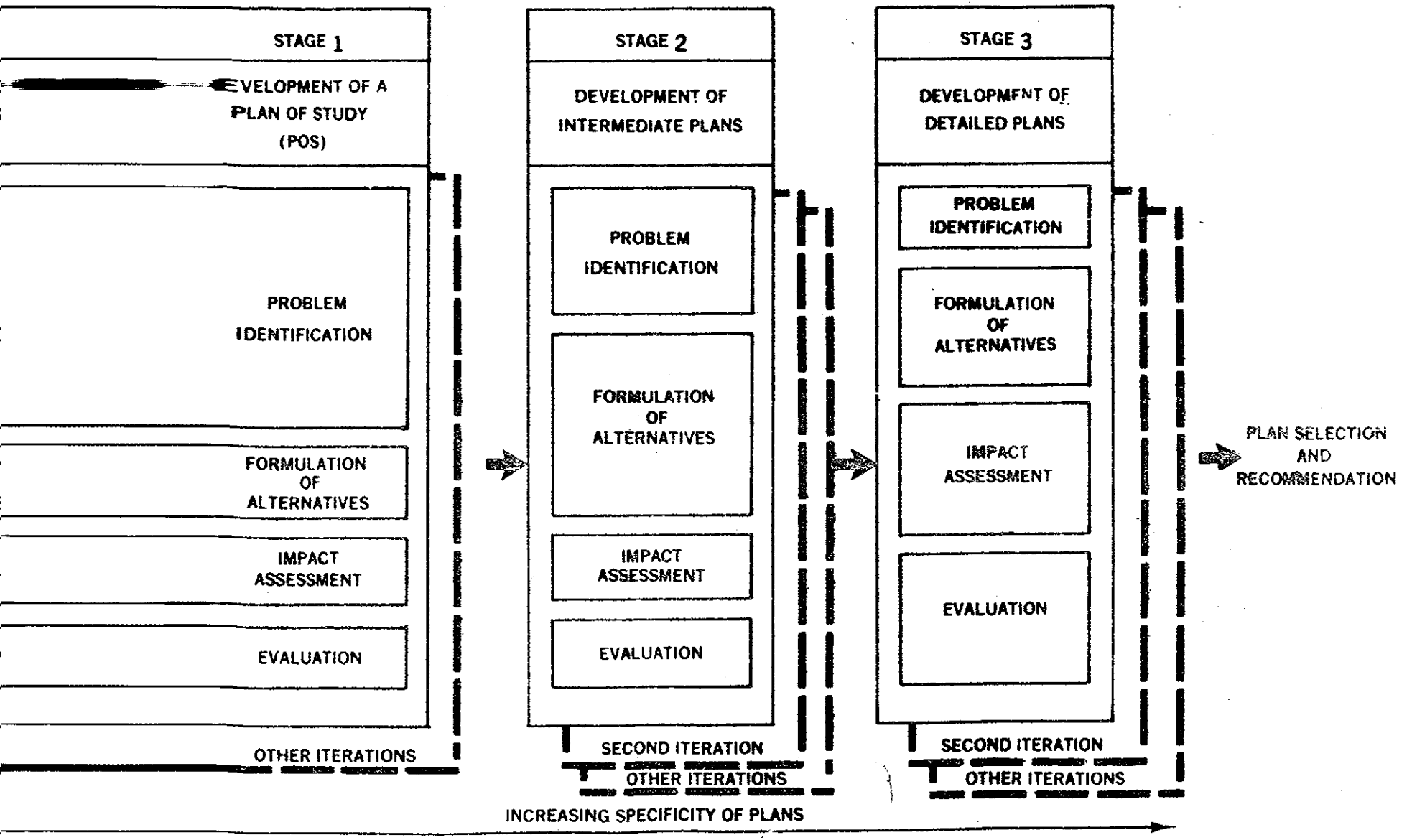
THE STUDY PROCESS AND OBJECTIVES

1. General. The study will be accomplished in three stages. The three stages are illustrated in Figure 2. Stage 1 emphasized problem identification, preparation of a plan of study, and responds to the study authority by making a reconnaissance to determine whether further study is warranted. The resulting reconnaissance report is the product of Stage 1 planning. Stage 2 more fully defines the problems and needs and outlines alternative plans without concentrating on detailed engineering or design considerations. The final stage of the study, Stage 3, consists of performing the necessary studies to select a final plan. A draft report and draft environmental impact statement will be the product of Stage 3. The level of detail of the tasks changes with each stage as shown, relatively, by the size of each block on figure #2.

The study process includes a public participation from start to finish. Various "publics" have already been identified and coordinated with as detailed earlier in this report. This will be a continuous process and expanded whenever necessary. Formal public meetings with all input being recorded will be held at the end of Stages 2 and 3.

The study process will include development of an Environmental Impact Statement and the required public review of it. Subsequent to public review and resolution of comments, a report and draft EIS will be forwarded to Washington for interagency review at that level and transmittal to Congress. Further detail on specific items to be studied will be presented later in this report.

2. National Objectives. The national objectives on which the study will be based are National Economic Development (NED) and Environmental Quality (EQ). The NED objective is to maximize the increase in the value of the nations output of goods and services and to improve national economic efficiency. The EQ objective is the enhancement of the quality of the environment by the management, conservation, preservation, creation, restoration, or improvement of the quality of natural and cultural resources and ecological systems. The alternate plans will be compared using a system of accounts that will display the beneficial and adverse effects of each plan on the NED and EQ objectives. Effects on regional development (RD) and social well-being (SWB) are also considered.


STAGE 1
VELOPMENT OF A
PLAN OF STUDY
(POS)
PROBLEM
IDENTIFICATION
FORMULATION
OF
ALTERNATIVES
IMPACT
ASSESSMENT
EVALUATION
OTHER ITERATIONS
STAGE 2
DEVELOPMENT OF
INTERMEDIATE PLANS
PROBLEM
IDENTIFICATION
FORMULATION
OF
ALTERNATIVES
IMPACT
ASSESSMENT
EVALUATION
SECOND ITERATION
OTHER ITERATIONS
STAGE 3
DEVELOPMENT OF
DETAILED PLANS
PROBLEM
IDENTIFICATION
FORMULATION
OF
ALTERNATIVES
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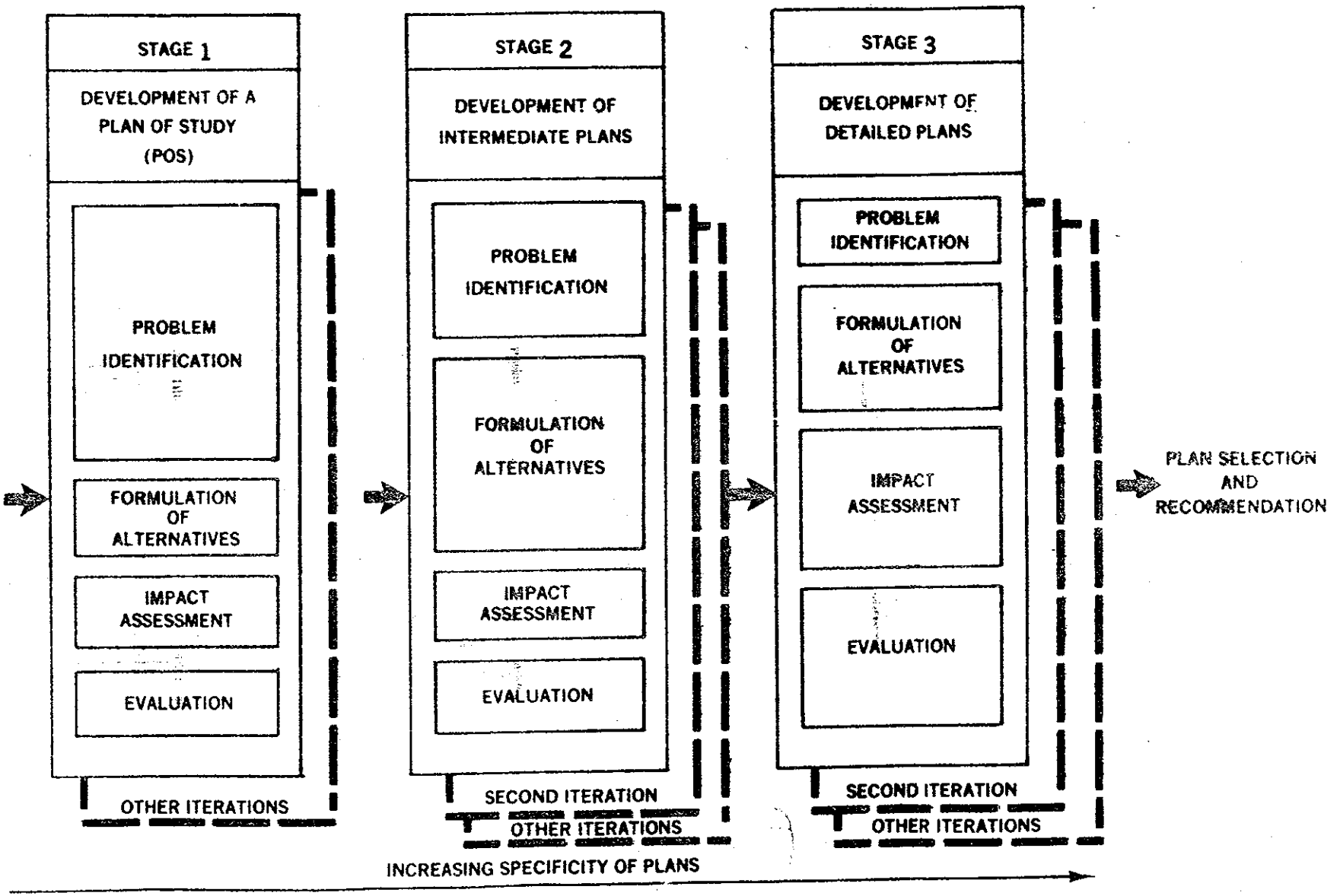
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PLAN SELECTION AND RECOMMENDATION
INCREASING SPECIFICITY OF PLANS

FIGURE 2

SECTION II: BASE CONDITIONS

ENVIRONMENTAL CONDITIONS

1. Setting. Lynn Harbor is located 10 miles by land and 14 miles by sea north of Boston. The harbor is formed by the Nahant Peninsula on its eastern side. Access to the harbor is from the south. The harbor is approximately 3 miles long and has an average width of 1-1/2 miles. The Saugus River empties into Lynn Harbor about halfway up its western shore. The towns surrounding the harbor are Nahant to the east, Lynn to the north and northwest, and Revere to the west. Saugus is also significantly influenced by the harbor due to the Saugus River and the close proximity of southeastern Saugus to the harbor. Major highway access to the area is provided by Rte. 1A (Lynnway) from Boston.

2. Climatology. Lynn Harbor generally experiences a temperate climate typical of the northeastern coast of the U.S. Humidity and precipitation is generally constant throughout the year. The average monthly rainfall is between three and four inches. Average temperatures vary from a mean low temperature of about 25°F in January to 78°F in July. Prevailing winds are generally from the northwest in the winter at a mean velocity of 14.5 mph and from the southwest in summer at a mean velocity of 11.2 mph.

3. Historical and Archaeological Features. For more than 200 years following Lynn's initial settlement in the 17th century, the inhabitants engaged extensively in fishing and maritime trade. Shipping was sufficiently developed by 1837 for the city to be declared a port of entry for foreign vessels. Fishing schooners sailed from Lynn Harbor to Massachusetts Bay and the Grand Banks during this period. The focal points of harbor development at that time were near the intersections at present day Route 1A with the old Lynnway (to the Nahant Circle) and with Commercial Street, and at the present crossing of Route 107 over the Saugus River. All of these wharf areas were filled during periods of industrial expansion in the late 19th and early 20th century.

Distance of the project area from 19th century harbor channels and disturbance of sediment during storms and as a result of harbor currents make the presence of significant historic or prehistoric resources unlikely within the project area. When disposal sites for the dredged material are determined, possible effects upon cultural resources will be assessed. Comments from the Massachusetts Historical Commission will then be sought for inclusion in the project feasibility report and environmental assessment or impact statement.

4. Fisheries Resources. The Lynn Harbor and Pine and Saugus River estuaries are well established as preferred locations for active sport fishing and are among the most actively utilized sports fishing areas on the North Shore. Mackerel, bass, and common ground fish are most actively sought in this regard.

Historically, fishing had been carried on in Lynn Harbor area prior to English colonization. Indians fished for salmon and trout in the rivers extensively. Fishing was very important to the colonists and they removed large quantities of bass, alewives, and cod from the area for food. In the 1800's, haddock, cod, bass, mackerel and tautog were taken year round and alewives in May. Shurtlaff (1937) listed all species known to exist in the Lynn area. These are listed in Table 1. The Division of Marine Fisheries of the Massachusetts Department of Natural Resources, in their 1972 report "A Study of the Marine Resources of Lynn-Saugus Harbor" listed all fish types obtained in the harbor in test samplings during 1968 and 1969 and their frequency. This table is reproduced herein as Table 2. Of 439.9 acres of productive soft shell clam habitat in the harbor, 92.6% are closed due to contamination. Lobster is harvested in the area in modest quantities.

Table 1

List of Species Known to Exist in Lynn Harbor
(after Shurtlaff, 1937)

Bluefish
Bream
Catfish
Cod
Conger Eel
Dogfish
Eel
English hake
Flounder
Frostfish
Goosefish
Groundshark
Haddock
Hake
Herring
Mackerel
Mackerel shark
Minnow
Perch
Pollock
Porgy
Sand Eel
Sculpin
Shrimp
Skate
Skipjack
Smelt
Sunfish
Tautog
Squid
Blackfish
Porpoise
Whale
Lobster
Crabs
Clams

APPENDIX 2

TABLE 2

Numerical Rank of All Finfish Species Collected in Lynn-Saugus Harbor, 1968-1969

		60-foot Haul Seine	120-foot Haul Seine	30-foot Shrimp Trawl	Totals
1.	winter flounder	5	77	1,420	1,502
2.	Atlantic silverside	460	294		754
3.	mummichog	625	15		640
4.	threespine stickleback	71	149	67	287
5.	striped killifish	276	2		278
6.	Atlantic tomcod	35	131	84	250
7.	red hake	95	9	9	113
8.	rainbow smelt	1	9	102	112
9.	Atlantic herring	4	72		76
10.	ninespine stickleback	33	34		67
11.	American eel		6	11	17
12.	yellowtail flounder			15	15
13.	northern pipefish	2	2	10	14
14.	fourspine stickleback	6	2	5	13
15.	cunner			12	12
16.	lumpfish	7		3	10
17.	ocean pout			9	9
18.	alewife	2	1	3	6
	grubby			6	6
19.	blueback herring			5	5
20.	Atlantic cod		1	3	4
	little and winter skate*			4	4
	longhorn sculpin		1	3	4
	shorthorn sculpin			4	4
21.	American sand lance	1		1	2
	Atlantic mackerel			2	2
22.	pollock			1	1
	rock gunnel			1	1
	seasnail		1		1
	striped bass		1		1
	windowpane			1	1
	Totals	1,623	807	1,781	4,211

*Not separated by species.

ECONOMIC, CULTURAL, AND SOCIOLOGICAL CONDITIONS

1. Introduction. The city of Lynn is located in Essex County on the North Shore of Massachusetts, ten miles north of Boston, and is included in the Boston Standard Metropolitan Statistical Area. It's 10.48 square miles of land area are bordered on the east by 8.3 miles of Atlantic Ocean shoreline and the town of Swampscott; on the south, by the city of Revere and the town of Nahant; on the west, by the towns of Saugus and Lynnfield; and on the north, by the cities of Peabody and Salem. An older urban area incorporated as a city in 1850, Lynn is ranked by population as the largest city in the North Shore and the twelfth largest in the state of Massachusetts.

2. Population. A continuous pattern of population decline has existed in Lynn over the last fifty years and has been especially prominent since 1950, as illustrated by Table 3. According to the most recent state census taken in 1975, over 10,000 Lynn residents had left the city since 1970, most likely because of a weakening economic base, an excessive property tax second only to Boston in the state of Massachusetts, and inadequate municipal services. Projection of future population levels in the city indicate a continued pattern of gradual decline.

The population decline in Lynn is not surprising in light of a national and statewide trend toward movement from an urban to a suburban setting. Even within the city limits, growth has occurred in those neighborhoods of a more residential character to somewhat offset the decrease in the neighborhoods adjacent to the city's core. Lynn's relatively large percentage of elderly, 14.6% of the population as compared with 11.25% statewide, is heavily concentrated in the older downtown neighborhoods, therefore, contributing to the dramatic decrease in population of those areas due to normal attrition.

When compared to statistics for Essex County population for similar periods of time (see Table 3), it is seen that the county, as a whole, declined in population for the first time since 1940 during the period 1970-1975 by 6,705. However, Lynn was the single largest contributing factor in the county's net out-migration. Without the loss of 10,054 Lynn residents, Essex County would have experienced a net in-migration of 3,349 persons.

3. Housing. Between 1960 and 1973, net new dwelling units added to existing housing facilities totaled nearly 1,000, with a decrease of approximately 5,000 people during the same time period. The resulting vacancy rate reached 5.0% in 1970, and has shown an increasing tendency in subsequent years. Of the nearly 31,000 housing units in Lynn listed in the 1970 U.S. Census, 45.3% are owner occupied and 54.7% are renter occupied. Vacancies are most frequently found in those areas in which rental occupancy predominates.

Table 3
Population Comparisons

	Lynn		Essex County		Massachusetts	
	Population	% change	Population	% change	Population	% change
1930	102,320	.3	498,040	-	4,269,614	-
1940	98,123	.4	496,313	-.3	4,316,721	1.1
1945	105,153	.7	519,333	4.6	4,493,281	4.1
1950	99,738	-.5	522,384	.59	4,690,514	4.4
1955	99,020	-.7	543,526	4.0	4,837,645	3.1
1960	94,478	-4.5	570,087	4.9	5,148,578	6.4
1965	91,982	-2.6	608,996	6.8	5,295,281	2.8
1970	90,294	-1.8	637,887	4.7	5,689,170	7.4
1975	80,240	-11.1	631,627	-2.6	5,818,000	2.3

Sources: U.S. Census 1930-1940, 1950, 1960, 1970
State Census 1945, 1955, 1965, 1975

Note: U.S. Census includes all persons living in the area during Census year; State Census counts only permanent residents.

One-unit housing structures predominate, constituting 35 percent of total dwelling structures. Various types of multi-unit dwellings combine to account for the remaining 65% of all occupied units.

The Metropolitan Area Planning Council (MAPC) estimated in 1973 that 1,928 units of Federal or State subsidized housing existed, and predicted an additional 500 units in the foreseeable future. This projected total of 2,472 subsidized units would account for 8.0% of Lynn's total housing, but would fall far short of the MAPC estimated need for 9,500 subsidized units.

The vast majority of the city's population, about 83%, is housed in structures dating back before 1939, many of which are in need of revitalization. Three and one-half percent of the total number of occupied housing units lack some or all plumbing facilities, and are thus classified by the U.S. Census Bureau as substandard. A majority of the structures that compose this 3.6% substandard category are rental units located in neighborhoods adjacent to the central business district.

Of all the occupied units in Lynn, 5.8% are classified by the U.S. Census Bureau as overcrowded, largely due to conditions existing in some of the low income housing projects. Demolitions of over 2,940 blighted dwelling units since 1964 has significantly decreased the level of substandard housing (See Table 4).

Overall, U.S. Census figures indicate that Lynn's housing conditions are not be considered critical. Many existing buildings could be raised to a level superior to adequate through rehabilitation and renovation. An emphasis on rehabilitation, rather than new construction, would contribute to the revitalization of those older stable neighborhoods which have the greatest need without altering their character.

4. Economic Activity and Structure. Manufacturing has always been and continues to be the foundation of Lynn's economy. Until the 1950's, the shoe industry provided a sound economic base for community growth and attracted of manufacturers. During the 1950's, technological advancements and unfavorable wage-level comparisons with other regions of the United States and foreign producers rendered a large portion of Lynn's mode of production obsolete. Although the loss resulting from the exodus of the shoe industry was significant, the manufacturing sector had become sufficiently diversified to prevent the blow from being fatal to the city's economy. The General Electric Company emerged as the city's leading manufacturer, reaching a peak level of employment at 22,750 in 1952, and currently maintains that dominance even though increased automation has reduced its employment to approximately 13,000. In addition to General Electric, several manufacturing firms employ a significant number of people in the production of leather and leather products, machinery, electrical machinery, incandescent and fluorescent light bulbs, fabricated metal products, rubber products, food

Table 4
City of Lynn - Housing
New Dwelling Units and Demolitions by Permit Issued - 1960-1973

	Single Family Dwelling Units	Apartment Dwelling Units	Dwelling Units Added by Conversions	Total New Dwelling Units	Demolitions	Net New Dwelling Units
1960	170	136	32	338		
1961	124	-	21	145		
1962	132	16	25	173		
1963	130	180	29	339		
1964	110	41	23	174	265	-91
1965	100	292	18	440	43	397
1966	60	14	13	87	128	-41
1967	57	1147	8	212	222	-10
1968	53	118	18	189	159	30
1969	25	103	8	136	145	9
1970	16	46	17	76	436	-357
1971	14	622	26	662	128	534
1972	15	80	79	174	175	-1
1973	15	789	61	865	340	525
1974	15	188	6	209	208	1
1975	9	232	190	431	64	367
1976	8	115	28	151	345	-194
1977	8	70	-4	74	282	-208
Total	1,051	3,189	628	4,878	2,940	961

Source: Lynn Building Dept. Records

production, clothing apparel and other finished goods, paper products, chemicals, and printing and publishing.

Total manufacturing employment has decreased from 28,000 in 1950 to 16,340 in 1976, a loss of 11,660 jobs in 26 years. Since 13,000 of these jobs are at General Electric, the non-GE manufacturing employment has been reduced to 3,340, a figure which proves consistent with statistics for manufacturing employment in other cities of similar size and character in Massachusetts. Manufacturing jobs in Lynn also tend to be of higher quality than those of comparable cities, with the total payroll in the manufacturing sector greatly exceeding the same payroll in these comparable cities.

Overall, 51.0% of all jobs in the city are categorized in the manufacturing sector, providing a continued dependence on manufacturing as a sound economic base. However, the existing trend is still toward decline, and at the current rate of 806 manufacturing jobs lost per year over the last five years, another 8,000 jobs, approximately 50% of the current total would be lost over the next ten years. A more realistic possibility is that decline will continue at a slower rate, until a minimum level of employment for the city's major manufacturers to remain in operation is reached.

In addition to manufacturing, a variety of industry sectors offer employment in Lynn. Wholesale and retail trade combine to provide 21.0% of the Lynn job market. Although wholesale trade has shown a gradual increasing trend since 1958, it is still not considered a major employment setting in Lynn. An approximate total of 90 wholesale firms employ an estimated 1,000 persons, while approximately 525 retail establishments employ an estimated 5,738. Although retail trade still employs a significant number of workers, it has either shown decline or remained static in terms of total employment for selected time intervals since 1958. The overall decrease in retailing mainly is in general merchandise, including department and discount department stores. It has decreased by over 54% since 1958 due to competition from established retail outlets in Boston; more modern shopping malls in neighboring Saugus, Peabody, and Danvers; and a decreasing population in Lynn.

Other industry categories, shown in Table 5, employing significant numbers in Lynn are construction, finance, insurance, real estate, transportation, communications, utilities, Government, and service industries. Employment in these areas has remained static, with little sustained growth or decline observed since 1958. The decline in total employment since 1971 is thus attributable to decreases in the manufacturing and retail sectors, as well as the declining population. It must be noted, however, that the figures in Table 5 represent employment offerings in Lynn rather than employment of the city's residents, thus reducing the impact of a declining population on total employment estimates.

Table 5
Covered Employment by Industry
City of Lynn

	1971	1972*	1973	1974	1975	1976
Total Employment	37,061	38,172	37,476	36,852	31,879	32,073
Arg., Forestry, Fishing	41	40	30	36	53	32
Mining	0	0	0	0	0	0
Contract Construction	908	818	755	727	584	570
Manufacturing	20,370	18,873	19,424	18,382	16,670	16,340
Trans., Comm., & Utilities	3,550	4,409	4,639	4,517	1,502#	1,505
Wholesale & Retail Trade	7,640	7,396	6,503	6,518	6,338	6,738
Finance, Insurance & Real Estate	1,269	1,294	1,001	938	1,038	1,097
Services	3,283	5,342	5,126	5,689	5,694	5,788

* Since January 1972 most nonprofit organizations formed and operated for religious, charitable, scientific, literary, educational or certain other purposes are covered by the Massachusetts Employment Security Law.

\# Prior to 1975 a large employer was reporting all Essex county employment as being in Lynn.

Source: Massachusetts Division of Employment Security

Note: Covered employment by industry includes all employment reported to DES in their annual survey.

5. Land Use. Because Lynn has been so highly developed for a long period of time, extensive changes in patterns of land use no longer occur. Although primarily considered an urban area, Lynn has approximately three square miles of forest preserve known as the Lynn Woods, considered the largest natural municipal forest in the country. Approximately one hundred acres of wetlands constitute the only other large undeveloped tracts of land in Lynn.

The largest percentage of developed land is used for residential purposes. The remainder is apportioned among commercial, industrial, recreational, and public use according to the percentages listed in Table 6.

6. Employment & Economic Characteristics of the Population. The total unemployment rate in Lynn is not dissimilar to that of other Massachusetts municipalities of its size and character, and has followed the same pattern of increase and decrease since 1970 as the national unemployment rate. Unemployment rose gradually from 6.9% in 1971 to a peak of 12.5% in 1975 and decreased to 9.4% in 1977 and approximately 8.2% for the first quarter of 1978.

The difference between Lynn and other comparable cities is the fact that a larger number of people are employed in Lynn than the number of employable residents. Since the skills available in the city's labor force do not always match its job market, some in-migration and out-migration of labor is necessary. As Table 7 (compiled with the most recent relevant U.S. Census Bureau data available) depicts, the total number employed by the city's firms was 37,061, resulting in 931 more Lynn jobs than employed Lynn workers. Regardless of this excess capacity in the job market, at least 7,975 Lynn residents seek employment outside the city. In the years subsequent to the compilation of these figures, changes in population and total employment offerings have probably not changed the relative level of net out-migration of labor by industry significantly since job losses were primarily restricted to manufacturing and retail and wholesale trade (see Table 5), for which there was previously a net in-migration of labor.

TABLE 6

City of Lynn
Land Use

Use	Percent	Acres
Residential	37.00	2,733
Commercial	4.00	296
Industrial	6.67	493
Extractive	-	-
Disposal Sites	.97	72
Transportative	1.48	110
Public Institutional	4.32	319
Open Space - Recreational	2.97	220
Open Space - Transitional	1.89	140
Agricultural (Cropland)	-	-
Agricultural (Pasture)	-	-
Forest	31.40	2,319
Wetlands (Inland)	.88	65
Wetlands (Saltwater)	.46	34
Water	7.89	583

Source: Metropolitan Area Planning Council

Table 7

Labor Force Characteristics
In-Migration and Out-Migration of Labor

Industry Groups	Lynn Jobs	Lynn Residents	New Out-Migration	Net In-Migration
Manufacturing	20,370	13,400		6,970
Wholesale & Retail Trade	7,640	7,279		361
Finance, Insurance & Real Estate	1,269	1,951	682	
Services	3,283	9,857	6,574	
Transportation, Communications, & Utilities	3,550	1,975		1,575
Construction	908	1,554	646	
Agriculture & Mining	41	114	73	
Total	37,061	36,130	7,975	8,906

Source: Compiled in 1971 by Massachusetts Division of Employment Security with 1970 U.S. Census Data

Even though there has been no sizeable increase in job opportunities in Lynn for clerical and service workers, the number of the city's residents categorized in these industries has increased dramatically. As Table 7 demonstrates these industry groups contribute significantly to total out-migration for employment purposes. Also illustrated by the table is the fact that Lynn offers employment to a minimum of 8,906 residents of neighboring communities.

Lynn does not compare favorably with some other municipalities of the same size, with the Boston SMSA, or with the state as a whole in regard to family income. Whereas Lynn has only 17.9% of its family income in the highest two reported brackets (over $15,000), the state as a whole claimed 25.2% in this bracket and the Boston SMSA 30.1%. In the lowest two brackets (less than $4,000), Lynn claimed 12.6% of its population compared to 9.2% of the Boston SMSA and 9.9% for the state. Up to 12.0% of the city's families receive some form of public assistance, compared with 6.1% of families statewide.

Other statistics are available to illustrate the relative economic situation of Lynn's population. The most recent estimate of per capita income (1974) in Lynn was $4,424 compared with a 1972 level of $3,716 and 1969 level of $3,064. If these latter figures for 1969 and 1972 are expressed in 1974 dollars, the real per capita incomes were $4,841 and $4,422, respectively. Thus, it appears that the per capita income remained static during the five-year period in which population decline accelerated and general economic conditions worsened. Lynn's 1974 per capita income, $4,424, was only slightly below that of the Commonwealth of Massachusetts, $4,755, and that of Essex County, $4,864.

7. Transportation. The major state and interstate highways of the North Shore, State 128, U.S. 1, and Interstate 95 all lie outside of the city limits, which results in limited access to the city. A series of local roads connect Lynn with other North Shore communities and Boston. Route 1A, the Lynnway, follows a path adjacent to Lynn Harbor and Lynn Beach, connecting the city to Salem and Beverly on the north and Boston, Logan Airport, and Boston Harbor shipping facilities on the south. Route 129 extends from the coast to the western city limits, cutting across the downtown area and providing access to State 128, leading to major arteries in western Massachusetts. Route 107 bisects Lynn perpendicular to Route 129, serving as a major artery for transportation within the city from the southern to northern boundaries. The general highway system in the Lynn area are shown on Figure 3.

Commuter rail service in Lynn is currently limited to the Boston and Maine Railroad, connecting the city with Boston and eight North Shore communities. Piggy-back service is available on the Boston and Maine in Cambridge, Mass., and the Penn Central in Boston. Extensive rail connections to serve the transportation needs of Lynn's manufacturers were never developed. Most of the transportation of manufactured

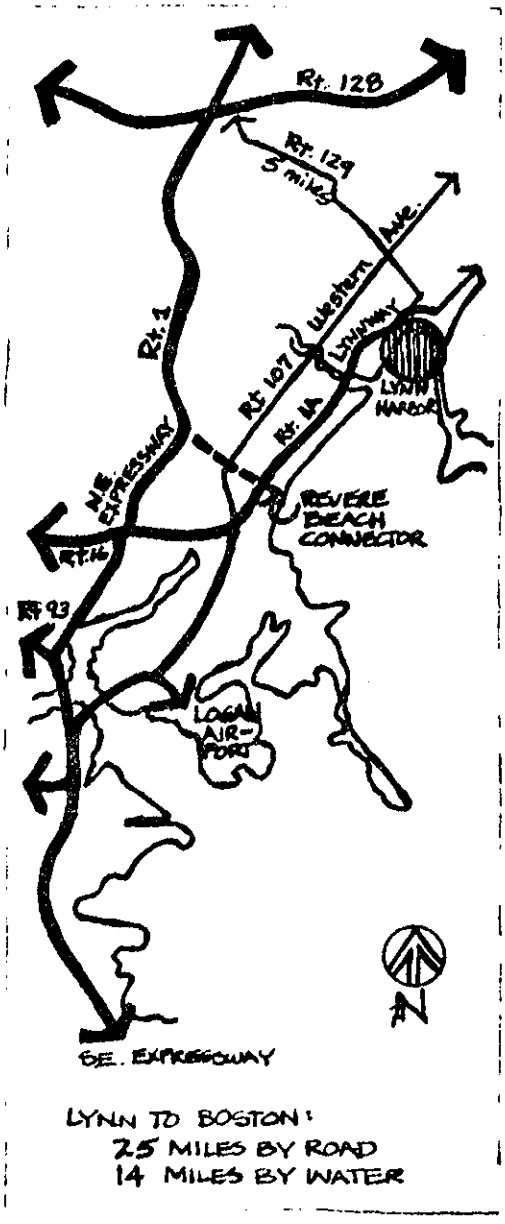

FIGURE #3

(After MIT Seagrant Report)

articles out of Lynn is via well-established truck routes to rail, dock, and air freight facilities in Boston. These well-developed trucking lines and the short distance to Boston combine to offer favorable shipping conditions to all parts of the country and the world.

A proposed extension of the Massachusetts Bay Transportation Authority's Blue Line to the Central Square area of Lynn within the next five years and an accompanying 2,000 car parking garage would enhance the Square's status as the focal point of North Shore mass transportation. Central Square is already the hub of intra-Lynn and North Shore bus service provided by the MBTA, and could potentially become a multi-nodal interchange for mass transportation.

8. Waterfront Development. Development and active commercial marine utilization of Lynn Harbor's waterfront area is almost totally non existent. Of all the commercial development that has taken place on the nearly 232 acres of land between the Lynnway (Rte. 1A) and the harbor, about 95% is related to the Lynnway and not to the harbor. Less than 1% is now harbor related. Tables 8 and 9 and their associated pie charts are taken from a recent report (May 1978) published under the M.I.T. Sea Grant Program entitled "Lynn Harbor: Planning for Coastal Development". They list the harbor land use patterns as a function of land area and shoreline usage, respectively. Actual use of the waterfront has been, over the past several years, limited primarily to recreation. From the boat ramp at the end of Blossom Street to the beginning of Nahant Beach there are charter boats, 3 Yacht clubs, and an 8-foot deep anchorage owned by the state. The rest of the shoreline, from Blossom Street to the Saugus River has not been used in years.

9. Waterway Improvements. Channel improvement and development has been active in Lynn Harbor since the mid 1800's. At the start, improvements were made mainly to facilitate the shipment of coal to power shoe factories and other Lynn industrial plants. The Saugus River channel on the west side of the harbor was dredged first to 8 feet and then to 12 feet. The west channel is approximately 150 - 200 feet wide. The authorized main Federal channel lies on the east side of the harbor. Since 1894, the Federal Government has authorized continual development and improvement of the channel. The channel was first dredged 200 feet wide to a depth of 10 feet. Then, in about 1900, Congress authorized a 15-foot channel, 200 feet wide and a turning basin at the north end of the channel, 500 feet by 300 feet, 15 feet deep. In 1908, Congress approved a widening of the channel to 300 feet and an enlargement of the turning basin to 500 feet square, all to a depth of 15 feet. In 1934, the channel was made 22 feet deep and the turning basin was again widened to 550 feet and the channel and turning basin were dredged to a depth of 22 feet. Congress authorized a plan to widen the turning basin in 1954 pending completion of dredging the adjacent municipal channel by local interests. None of this dredging has been completed to date. The alignment and configuration of authorized channels in the harbor is shown on Figure 1. In 1976, the Corps of Engineers conducted a

TABLE 3-1
HARBOR LAND USE BY LAND AREA - WATER EDGE TO THE LYNNWAY

	Square Feet	Acres	Percentage of Total	
Residential				**4.4%**
Multifamily (under construction)	204,707	4.70	2.0%	
Motel	241,998	5.55	2.4%	
Commercial				**17.9%**
Retail/office	313,707	7.20	3.1%	
Auto sales/service	1,447,076	33.22	14.4%	
Fast food restaurant	39,799	.91	.4%	
Industrial				**32.4%**
Light (public utility)	2,257,049	51.81	22.4%	
Other	452,751	10.39	4.5%	
Heavy (mfg., metal extraction)	733,499	16.84	7.3%	
Recreation				**8.1%**
Public	542,410	12.45	5.4%	
Private (yacht clubs and marina)	118,082	2.71	1.2%	
Other	147,157	3.38	1.5%	
Municipal				**17.6%**
Dept. of Public Works	590,408	13.55	5.9%	
Solid waste (landfill)	1,175,700	26.99	11.7%	
Vacant	1,815,070	41.67	18.0%	**18.0%**
Total	10,079,413	231.39		

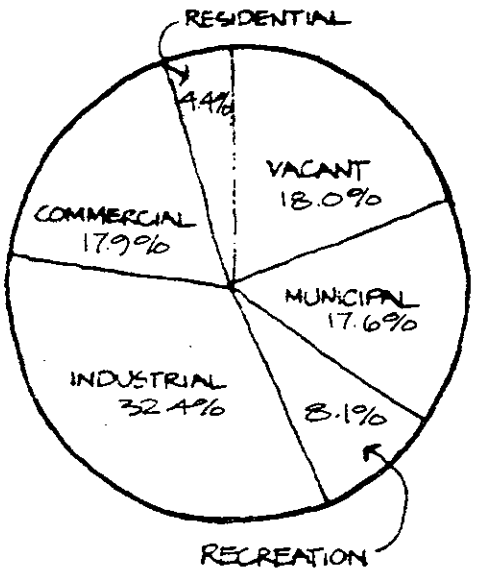

TABLE #8

(After MIT Seagrant Report)

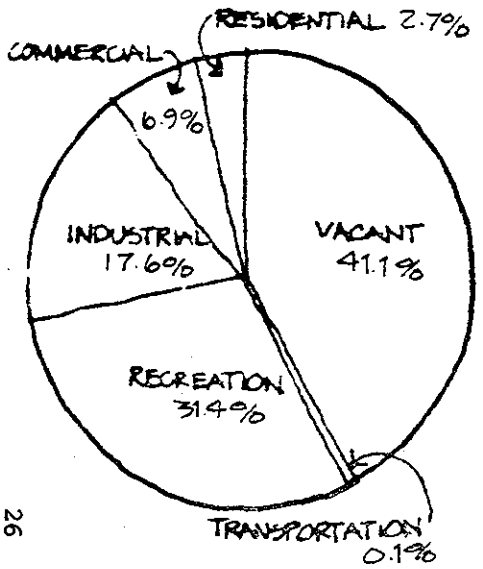

TABLE 3-2
HARBOR LAND USE BY PERCENTAGE OF SHORELINE IN EACH USE
(General Edwards Bridge to the Nahant City Circle Boundary)

Approximate linear feet: 12,700

Residential		2.7%
Multifamily (under construction)	2.7%	
Commercial		6.9%
Retail/office	0	
Auto sales/service	6.9%	
Fast food restaurant	0	
Industrial		17.6%
Light	10.8%	
Heavy	6.8%	
Recreation		31.4%
public (public landing and Electric Company Park)	23.0%	
Private (yacht clubs and marina)	8.4%	
Transportation		.1%
Vacant		41.1%

TABLE #9

(After MIT Seagrant Report)

condition survey of existing depths in the Federal channel. The entire channel had maintained its depth fairly well and most locations are still at a depth of 20 - 22 feet. The turning basin has filled somewhat and is now at approximate depths of 17 to 18 feet. A new survey, to include the municipal channel, is scheduled for June 1979. Copies of the results of the 1976 survey or any future surveys are available at the New England Division offices.

10. Waterborne Commerce. During the history of the harbor, various commodities have been shipped through Lynn Harbor to include shellfish, fresh fish, coal, jet fuel, and some iron and steel. Commerce activity is now, however, nonexistent. The last reported commodity brought into Lynn Harbor was in 1973.

11. Conclusions. Due to changes in technological and economic conditions beyond its control, Lynn has experienced a period of drastic decline in recent decades, typical of many older industrial cities of the Northeastern United States. A shrinking tax base resulting from the death of the shoe industry has placed an unacceptable burden on the property taxpayer and has contributed to a steady decrease in the population, which in turn has dealt a severe blow to retail and commercial development in downtown Lynn. The obvious financial plight of the city and the associated physical decay has predictably damaged its image in the eyes of investors and has, therefore, become as much a cause as a symptom of the overall economic malady.

Despite the severity of the problems encountered in Lynn, the city remains optimistic that its recent planning initiatives offer a realistic opportunity for revitalization. The city remains a regional job center, primarily due to major industrial enterprises such as General Electric and Norelco. It has been tentatively selected as the site of a major commuter rail service interchange that would link the center of its retail industry to neighboring communities, thus providing the necessary market expansion for future retail development.

After years of neglect and underutilization, Lynn Harbor has come to be recognized as one of Lynn's most valuable natural resources. Changes in the economy and transportation over the past three decades have resulted in the decline of the Harbor from a busy commercial port to an almost idle port, limited to a few recreational and non-water related commercial and industrial uses.

Several possible reasons can be cited for the failure of Lynn Harbor and the surrounding area to develop fully its potential for various maritime activities. As previously mentioned, numerous changes in technology; increased competition in the marketplace; and regional disadvantages in the costs of labor, energy, transportation, and taxation led to the death of the shoe industry, the foundation of the city's economy. The resulting shift in manufacturing activities in Lynn rendered transport activities in the harbor outmoded, and the weakening of the general

economic environment prevented the revitalization necessary to maintain the harbor's commercial viability.

The harbor's close proximity to Salem and Boston may also have served as an obstacle to this development, since superior port facilities had previously been developed in both those cities to satisfy the needs of the area. The shallowness of Lynn Harbor and the high cost of required dredging also proved to be a constraint against development when larger tankers and cargo-carrying vessels came into more frequent use.

The construction of the Lynnway at the advent of the trucking industry, as a direct link to transport facilities in Boston, provided Lynn with a seemingly desirable alternative to the costly construction of deeper channels and additional wharves and warehouses. Completion of the Lynnway was also expected to enhance industrial development along the Harbor, but a combination of poor harbor and rail facilities, high costs of construction materials and labor in the area, and lack of any official aggressive industrial inducement policy prevented this expectation from being realized. Instead, a variety of commercial establishments, primarily automobile dealerships, gas stations, eating and drinking establishments, and a scattering of light industrial enterprises, located on land immediately adjacent to the highway, provided a barrier between the harbor area and the more active residential and commercial areas of downtown Lynn.

Current land-use in the harbor area is centered around the Lynnway rather than along the shoreline, as illustrated by Tables 8 and 9. An estimated 41.1% of the immediate shoreline is totally vacant, as is 18% of the 231.39 acres of land between the harbor and the Lynnway. Previous studies have estimated that as much as 80% of the shoreline could be considered changeable, with a wide range of commercial and industrial development possibilities.

Lynn's fine natural harbor in its present underutilized state could, if developed, provide the necessary catalytic action leading to economic revitalization. Available and suitable for a variety of industrial, commercial, and recreational uses, development of the harbor land area should serve as a stimulant to development in other areas of Lynn. Although additional tax revenues would be generated, they would not in themselves be sufficient to cure the financial problems that the city faces or relieve the property tax burden borne by the residents. The major benefits resulting from the development of Lynn Harbor would be the creation of an atmosphere conducive to the generation of future investment in the city.

Local interests have initiated steps to begin the development of the harbor so that its full potential as a valuable natural resource may be realized and utilized. Vacant land is to be obtained by eminent domain and dredging of a portion of the municipal channel is to be accomplished immediately upon acquistion of this property. Funding is currently

available for the first stage of this dredging and construction of a new associated pier. The community has high hopes that this improvement will stimulate the development of Lynn Harbor and the surrounding property to its full potential.

VESSEL TRAFFIC

Traffic in Lynn Harbor has been mainly limited to private and chartered recreational traffic for years. In 1975, only 133 commercial vessels ventured into and out of the harbor. Traffic frequency remains approximately the same today.

SECTION III: PROBLEMS AND NEEDS

INTRODUCTION

This section describes the problems that currently exist in the Lynn Harbor area that are preventing the full development of the area's potential and also sites the needs that must be met in order to develop this potential. None of the suggested improvements require deepening channel depths below that previously authorized. Needs were identified through public meetings, interaction with the local municipal planning board, and reference to previous reports on area development cited in Section I of this report.

PROBLEMS

The major problems preventing commercial utilization of the harbor are:

- Lack of wharfs and docking facilities
- Absence of adequate channel draft in the area of municipal access
- Absence of protective structures to reduce wave height and associated water movements detrimental to mooring and loading procedures

The size of vessels desirable for utilization of facilities planned by the city for Lynn Harbor would be those used by the American fishing fleet and foreign and domesitic trade vessels. Immediate fleet usage for Lynn Harbor is expected to be similar to that presently in Gloucester Harbor with future usage by larger vessels anticipated. Lobster boats in the New England fleet typically average about 35 feet in length and require a 3-1/2 foot draft. The larger boats are approximately 55 feet in length and require a 5 foot draft. Typical fishing trawlers average near 55 feet in length with a required draft of 7-1/2 feet. Some of the larger trawlers currently being constructed are as much as 150 feet in length with a 16-foot required draft and it is anticipated that future large craft may require as much as a 20-foot draft. Some foreign trawlers are already being constructed to these larger dimensions.

Lynn's current waterfront development plans call for the development of fish processing plants in hopes of attracting large trawler traffic. If fully developed, the plan also includes facilities for producing frozen fish products and shipping them out of Lynn Harbor on large cargo vessels that could draft up to 20 ft. and more. In view of this, Lynn needs to have a channel and associated turning basins, etc. with adequate access to the wharves to encourage the use of these large vessels. The currently authorized Federal channel and turning basin have sufficient depth for this traffic and possibly larger vessels if vessels are brough in with the tides. Access to the planned wharf area is, however, inadequate at the present time.

No protection from wave action currently exists in the harbor. If the harbor is to be developed for fish trawler traffic, some protection must be provided for ships included in commercial activity, loading, unloading, and mooring (berthing). It is hoped that sufficient harbor protection will encourage the use of the harbor by new vessels that will be part of a permanent fleet docked in Lynn rather than simply transient vessels from other ports.

NEEDS

In view of the problems and requirements cited above, the needs of the city of Lynn can be summarized below:

1. Sufficient dredging to supply access to all the waterfront property available for development
2. Protection of these waterfront areas from damaging wave action to permit full waterfront development
3. Maintenance of existing Federal channels required for harbor access

Due to lack of wharf access and harbor protection, Lynn Harbor is perhaps the most grossly underutilized harbor on the east coast. If these improvements are not made, the harbor will continue to be used as a small recreational facility. Local interests are actively supporting the project and plans for associated development are ready to be implemented.

SECTION IV: STAGE I PLANNING RESULTS

INTRODUCTION

This section of the report presents the results of study efforts to date. Efforts have included an identification of existing and projected environmental, economic, social and cultural base conditions, presented in Section II; an identification of problems and desires expressed by local interests, presented in Section III; and a formulation of alternatives, assessment of impacts, and evaluation of the costs and benefits of the proposed plans, presented in this Section. Due to the preliminary nature of this stage of study, alternative plans of improvement have not been fully developed; rather, the plans have been developed only in enough detail to make general comparisons and evaluations and to show justification for proceeding on to a more detailed stage of study. A plan for conducting further stages of study is included in Section V.

CONSIDERED PLANS OF IMPROVEMENT

Any plan for improvement of the harbor must address five basic areas of consideration that have been discussed through initial concept planning. They are:

1. General Harbor Access: The existing Federal channel.
2. Access to and Egress from Harbor Facilities: The municipal channel turning basin or exit route.
3. Harbor Protection: Breakwater etc.
4. Mooring & Berthing.
5. Disposal of Dredged Material.

Alternate plans will discuss varying amounts of development of these five facets.

The development plan presented by the local interests (city of Lynn) addresses all of these matters to some degree. Their plan (LEDIC plan) is viable and contains all of the aspects under consideration here.

Alternatives to the proposed plans include a "no action" plan (completion and maintenance of the currently authorized channel only); extension of the Federal channel to include dredging in the area of municipal wharves with a turning basin at the southern end; and provisions for one way traffic by connection to the wharf area to the open sea by a second channel in the western part of the harbor in the approximate vicinity of the existing Lynn Gas and Electric Company Channel. Various alternatives will also be

considered for protection of the harbor by means of a breakwater at the southernmost extent of the harbor's municipal channel, adjacent to the Saugus River channel. Alternatives will also be considered with varying amounts of recreational development. Disposal of dredged material could be done at sea, on land, or possibly in an area confined in part by a breakwater if contaminated material is dredged and special disposal techniques are deemed necessary and feasible.

Combinations of these alternative plans gave rise to the 9 alternatives outlined here:

Alternative #1 - No action - Maintain only the existing authorized channel (see Figure #4).
Alternative #2 - Fully develop navigational channels, to include the municipal channel and a turning basin, for full municipal waterfront access (see Figure #5).
Alternative #3 - Construct a breakwater to protect the harbor with fully developed channels (see Figure #6).
Alternative #4 - Circular access utilizing the partially dredged gas company channel without a breakwater (see Figure #7).
Alternative #5 - Circular access utilizing the gas company channel and a breakwater (see Figure #8).
Alternative #6 - Same as #3 but with mooring areas dredged for recreational craft (see Figure #9).
Alternative #7 - Same as #5 with mooring areas dredged for recreational craft (see Figure #10).
Alternative #8 - Dredge whole harbor & extend breakwater for recreation development (see Figure #11).
Alternative #9 - Deep draft dredging (see Figure #12).

It should be noted that none of the above alternatives consider various disposal alternatives for dredged materials. This decision will be based on considerations to be developed later in the planning process. Disposal methods will be decided based on environmental considerations, availability of disposal area and cost. More data will be obtained on the character of the material to be dredged to decide if it is suitable for normal disposal methods or if it would require special handling. In any case, the cost of dredge disposal should be approximately the same for all plans so that whatever price is chosen should not drastically effect the alternatives chosen for further study. A unit cost for dredging used herein will be that associated with what is considered to be the most costly disposal alternative possible. This cost will be revised during more advanced study stages when the character of material to be disposed of and the availability and cost of various disposal areas is better defined.

PROJECT COSTS

Possible project costs would be directly attributable to dredging, disposal of dredged material, and the construction of a breakwater. Some alternatives would also involve the relocation of an existing 60" cast iron sewage outfall line that crosses the harbor approximately north to south as shown on Figure 1 and Figures 7, 8, 10, and 11(alternative plans effected). In order to determine project costs associated with each alternative, an estimate was first made of the amount of material that would have to be dredged for each respective plan. This was accomplished by using a recent Corps of Engineers hydrographic survey of the Federal channel and estimates of depths in the municipal channel. A complete hydrographic survey of the harbor is currently being performed and will be used in future quantity and cost estmates. Borings taken in the area in the past by the city of Lynn and the New England Power Company, show the materials that will be encountered during dredging operations for any of the alternatives. It is not expected that any material will be encountered that will require blasting operations. Cost to complete this work includes disposal of this material at one of several locations as previously discussed. For the purpose of this report, disposal at sea has been used to estimate costs. The cost of a stone breakwater was then estimated for the respective length included in each plan that requires a breakwater. The breakwater cost was based on a preliminary design that was done using historical tides and design methods outlined in the "Shore Protection Manual". In future studies, alternate types of breakwaters (other than stone) will be considered and their cost compared to that of a stone structure. In the feasibility report for Boston Harbor, one alternative dumping site identified for rock from the channels to be excavated is Lynn Harbor with the idea that it could be used for the breakwater at minimal cost. This idea will be discussed more in future planning stages. And lastly, the cost of relocation of certain lengths of the 60 inch sewage outfall pipe was computed for those plans that would require its disturbance. It must be assured that the sewage outfall's operational integrity is maintained and that no disturbance of current disposal methods be allowed. All the above costs were totalled to obtain the total cost of each alternative plan. In addition to these costs, an allowance of 15% of the alternative's cost is included to compensate for unforseen construction problems and data refinement and 8% is added for the engineering and design that will be required to develop the recommended plan.

Since the project is based on an economic life of 50 years, project costs are amortized over this period. The capitol recovery factor used for this process is based on an interest rate of 6 7/8%. The estimated cost of annual maintenance is included in the annual

charges. Table 10 summarizes first costs and annual charges for each alternative.

PROJECT BENEFITS

Potential benefits directly attributable to the proposed alternative plans for the improvement of Lynn Harbor are of four major types, i.e.: net income benefits derived from commercial fishing, transportation savings in the shipment of commodities, recreational benefits from increased boating opportunities, and land enhancement benefits from the creation of new usable land with the spoil dredged from the harbor floor.

The major benefit expected to accrue to the various alternatives is an increased net income to fishermen. By definition, the net income benefit is equal to the ex-vessel value of total catch less the cost of operation, generally assumed to be one-third (33%) of the catch value. The net concept dictates that any income designated as a benefit is actually new or additional income produced directly as a result of project implementation rather than a transfer of income normally attributable to activity at other regional ports.

In the case of proposed improvements at Lynn Harbor, net income benefits are based on anticipated future growth of the fishing industry as projected by the New England Fisheries Development Program (NEFDP), an industry-government partnership formed in 1973 in an attempt to offset some of the economic decline in the New England fishing industry due to over-exploitation of the traditional species found off our shores by foreign nationals. Aided by the new 200-mile limit on territorial waters, NEFDP's initial goal of expanding New England fisheries production by $10,000,000 per year by the end of 1978 was achieved.

In their report on NEFDP's progress in 1977, the New England Fisheries Steering Committee projected a total landing of 701,000 metric tons of underutilized fish species by 1982. This category of fish includes squid, herring, whiting, red hake, mackerel, ocean pout, flounder, skate, and dogfish, as well as various other species not extensively marketed in the United States at the present time. Many of these species are widely demanded in European markets, however, and should become more palatable to American consumers as the cost of alternative fish species and meats rise in comparison and greater quantitites of these species become domestically available. Table 11 lists the projected catch of underutilized fish by species and ex-vessel value for 1982.

Plans for the improvement of Lynn Harbor are structured around the development of these underutilized species to provide the additional resource necessary to support the expansion of the fishing industry. The LEDIC report entitled A Proposal to Develop the New Port of Lynn

TABLE 10

ALTERNATIVE COSTS

PLAN	FIRST COST	ANNUAL COST
Alternative 1	0	0
Alternative 2	$3,088,700	$220,250
Alternative 3	$6,627,400	$472,600
Alternative 4	$5,419,720	$386,480
Alternative 5	$8,958,430	$638,800
Alternative 6	$6,961,550	$496,400
Alternative 7	$9,292,600	$662,650
Alternative 8	$21,963,900	$1,566,250
Alternative 9	$30,618,000	$2,183,400

TABLE 11

PROJECTED CATCH OF UNDERUTILIZED SPECIES

1982

SPECIES	LANDINGS (Metric Tons)	EX-VESSEL VALUE (Millions)
Squid	79,000	$52.3
Herring	100,000	11.0
Whiting	115,000	25.4
Red Hake	44,000	9.7
Mackerel	88,000	23.3
Misc.	275,000	60.6
TOTAL	701,000	182.3

estimated on the basis of communication with various commercial fishing enterprises throughout New England, other U.S. coastal regions, and several foreign nations that 100 fishing vessels could reasonably be expected at Lynn Harbor. It was further estimated that these 100 vessels could potentially account for the landing of 15-20% of the total 1982 projected catch of 701,000 metric tons of underutilized species. For the purposes of this report, a more conservative projected fleet of 50 vessels with the potential of landing 5% of total available resource will be assumed. Thus, 35,050 metric tons with a total ex-vessel value of $9,113,000 could reasonably be expected at Lynn Harbor after completion of the proposed dredging and breakwater construction assumed in the LEDIC plan. The net income to fishermen after deducting 33% for operating expenses would therefore total $6,105,710 for the improvements suggested in Alternative 3 (which corresponds to the LEDIC plan).

The benefits that would result from the implementation of each of the other eight alternatives have also been calculated, using the same basic catch data as for Alternative 3. Alternative 1, the "no-action" plan, would merely allow a continuation of the status quo and would therefore involve no costs or benefits.

Alternative 2, providing all of the dredging included in the LEDIC plan without the accompanying breakwater, would attract fewer commercial vessels to Lynn due to the lack of protection. It was estimated that approximately 50% of the vessels that would be expected to utilize Lynn Harbor as improved by Alternative 3 would actually moor at the harbor after completion of Alternative 2, and only on a transient basis, 50% of the time. Thus, approximately 25% of the predicted landings for Alternative 3 could be expected with Alternative 3, amounting to 8,763 metric tons valued at $2,278,380. Deducting 33% for normal operating expenses, a net income benefit of $1,526,428 would be anticipated.

Alternatives 4 and 5, would provide improvements similar to Alternatives 2 and 3 respectively, but with a channel designed for circular access to dock facilities. It does not appear that the additional dredging required for this purpose would attract any greater number of vessels than anticipated under the alternatives already discussed, and therefore no larger net income benefit would be realized. The benefits accruing to Alternative 4 are assumed to equal those for Alternative 2, and those for Alternative 5 would equal those of the LEDIC plan because of the added protection of the breakwater.

Alternatives 6, 7, and 8, would all provide additional dredging of mooring areas for recreational vessels and would, therefore, involve the estimation of recreational benefits over and above the net income benefit. Alternatives 6 and 7 call for construction of an anchorage area covering approximately 7 acres of surface areas. If

1600 square feet of area is necessary to accommodate the open mooring of an average size vessel, approximately 25 vessels per acre or 175 for the entire anchorage area could be expected. Considering the great demand for recreational moorings all along the New England Coast and the waiting lists currently reported by the three marinas located at Lynn Harbor, it is estimated that a maximum of three years would be required for the anchorage to reach its 175 vessel capacity.

Recreational benefits for plans 6 and 7 were based on comparison with an estimated net return on investment for each craft if utilized on a for-hire basis (as stipulated in Corps regulations EM 1120-2-113, Appendix I), and are presented in Table 12. Net income benefits for Alternative 6 correspond with those for Alternative 3 because both plans would provide the same channel conditions with the same level of protection. Similarly, net income benefits for Alternative 7 are assumed equal to those of Alternative 5.

A breakwater extending further into the harbor would be provided by Alternative 8, and combined with more extensive dredging would create approximately 206 acres of anchorage area throughout the harbor. Although this area would be sufficient to accommodate over 5000 recreational craft, a more realistic projected fleet size of 500 vessels at the end of a twenty-five year growth period is assumed. Recreational benefits based on this assumption are presented in Table 13 and would combine with a net income benefit equal to that of the LEDIC plan for a total project benefit.

A final plan, Alternative 9, would dredge the Lynn Harbor channel to a depth of 35 feet to allow passage of larger, deeper draft vessels. The possibility of expanding the use of the harbor for more extensive commercial shipment of commodities may lead to the realization of additional benefits for transportation savings over present modes of transporting those same commodities. The probability of a substantial increase in utilization of the harbor for commercial shipping appears slim, however, due to several factors. Highway and rail access from the harbor area to major market areas is presently inadequate to handle the distribution of large cargo quantities. Additional pier facilities would also be necessary to attract shippers to Lynn. Whether the demand for port facilities in the area actually exists is also questionable at the present time due to the announcement of plans to expand and improve container facilities in nearby Boston Harbor. Considering the high cost of Alternative 9, it does not appear that sufficient benefits would accrue to the plan to justify the project economically and this alternative will not be considered further.

The total project benefits expected to accrue to each of the nine alternative plans proposed are shown in Table 14. Transportation and land enhancement benefits were not computed for the analysis in

TABLE 12 - BENEFITS TO RECREATIONAL BOATING

LYNN HARBOR, LYNN, MASSACHUSETTS
1978 BOATING VALUES

7-Acre Anchorage Area
1-3 Years After Completion

TYPE OF CRAFT AND LENGTH (Feet)		No. of Boats	DEPRECIATED VALUE Average $	DEPRECIATED VALUE Total $	PERCENT RETURN Ideal	PERCENT RETURN % of Ideal Present	PERCENT RETURN % of Ideal Future	PERCENT RETURN Gain	VALUE $	ON CRUISE Avg. Days	ON CRUISE % of Season	ON CRUISE Value $
RECREATIONAL FLEET												
Outboards	10-14		2750		14		100					
	15-20	21	3600	75600	13		100	13	9828			
	21&Up		6550		13		100					
Sterndrive	15-20	12	5850	70200	12		100	12	8424			
	21-25	12	9200	110400	11		100	11	12144			
	26&Up		18150		10		100					
Inboards	15-20		6600		12		100					
	21-30	40	13500	540000	12		100	12	64800	14	9	5832
	31-40	32	36950	1182400	11		100	11	130064	19	12	15608
	41-50	5	87600	438000	10		100	10	43800	32	20	8760
	51&Up	5	174900	874500	9		100	9	78705	48	30	23612
Cruising Sailboats	15-20		4300		8		100					
	21-30	21	13550	284550	8		100	8	22764	8	5	1138
	31-40	4	37350	149400	7		100	7	10458	26	16	1673
	41&Up		73800		6		100					
Daysailers	8-15		1200		12		100					
	16-20	18	2950	53100	12		100	12	6372			
	21-25	5	5500	27500	11		100	11	3025	8	5	151
	26&Up		10550		10		100					
TOTALS		175		3805650					390384			56774

Net Benefits: $390,384 - $56,774 = $333,610
$333,610 x .93470 = $311,875

TABLE 13 - BENEFITS TO RECREATIONAL BOATING

LYNN HARBOR, LYNN, MASSACHUSETTS

1978 BOATING VALUES

Complete Harbor Anchorage Area
25 Years After Completion

TYPE OF CRAFT AND LENGTH (Feet)		No. of Boats	DEPRECIATED VALUE Average $	DEPRECIATED VALUE Total $	PERCENT RETURN Ideal	PERCENT RETURN % of Ideal Present	PERCENT RETURN % of Ideal Future	PERCENT RETURN Gain	VALUE $	ON CRUISE Avg. Days	ON CRUISE % of Season	ON CRUISE Value $
RECREATIONAL FLEET												
Outboards	10-14		2750		14		100					
	15-20	60	3600	216000	13		100	13	2808			
	21&Up		6550		13		100					
Sterndrive	15-20	35	5850	204750	12		100	12	24570			
	21-25	35	9200	322000	11		100	11	35420			
	26&Up		18150		10		100					
Inboards	15-20		6600		12		100					
	21-30	115	13500	1552500	12		100	12	173880	14	9	15649
	31-40	90	36950	3325500	11		100	11	365805	19	12	43817
	41-50	15	87600	1314000	10		100	10	131400	32	20	26280
	51&Up	15	174900	2623500	9		100	9	236115	48	30	70835
Cruising Sailboats	15-20		4300		8		100					
	21-30	60	13550	813000	8		100	8	65040	8	5	325
	31-40	10	37350	373500	7		100	7	26145	26	16	4183
	41&Up		73800		6		100					
Daysailers	8-15		1200		12		100					
	16-20	50	2950	147500	12		100	12	17700			
	21-25	15	5500	82500	11		100	11	9075	8	5	4504
	26&Up		10550		10		100					
TOTALS		500		10974750					1087958			165673

Net Benefits: $1,087,958 - $165,673 = $922,285

Annual Equivalent Net Benefits: $922,285 x .4853277 = $447,610

TABLE 14 ANNUAL ALTERNATIVE BENEFITS

PLAN	NET INCOME GAIN	RECREATION	TRANSPORTATION SAVINGS	TOTAL
Alternative 1	0	0	0	0
Alternative 2	$1,526,430	-	-	$1,526,430
Alternative 3	$6,105,710	-	-	$6,105,710
Alternative 4	$1,526,430	-	-	$1,526,430
Alternative 5	$6,105,710	-	-	$6,105,710
Alternative 6	$6,105,710	$311,825	-	$6,417,535
Alternative 7	$6,105,710	$311,825	-	$6,417,535
Alternative 8	$6,105,710	$447,610	-	$6,553,320
Alternative 9				

this report. These potential benefits will be computed in detail in further planning stages when more detailed data can be obtained and analyzed.

In addition to economic benefits resulting directly from the project, there would be "secondary" and "intangible" benefits realized in connection with the project. Secondary benefits which will be realized are new commercial activity, the generation of many jobs in the harbor area, and increased utilization of lands adjoining the harbor. Intangible benefits would include such things as strategic value of the harbor for military transport.

Only direct economic benefits are used in the benefit-cost comparison to be discussed in the "Economic Justification" portion of this section of the report, but the secondary and intangible benefits should be given some consideration in the evaluation process.

ECONOMIC JUSTIFICATION

By comparing the annual benefits to the annual costs, a determination as to the economic justification can be made. The recommended plan for National Economic Development is selected from among those plans for which a return of at least one dollar on every dollar invested can be expected, that is displaying a ratio of benefits to costs greater than or equal to, unity. The final criteria applied to economically justified plans is the maximization of excess net benefits, or selection of that plan for which the benefits exceed the costs by the greatest amount. According to these specifications, Alternative 6 appears to be the recommended plan, as demonstrated by Table 15. However, because recreational benefits are included in the economic justification of this plan, non-Federal cost sharing would be required. Of those alternative which would not require local contributions to finance the project, Alternative 3, the LEDIC plan, is the optimal improvement scheme.

It should be noted that the total benefits presented are conservative estimates based on a much smaller percentage share of catch landings than actually anticipated by local officials in previous reports.

Although it appears that the alternatives presented warrant further consideration as economically feasible plans, extensive field investigation will be necessary to further substantiate the most probable number of commercial and recreational vessels that could reasonably be expected at Lynn Harbor upon completion of a project. Additional contacts with commercial fishing enterprises must be made to document their intention to expand into Lynn, thus establishing a sufficient demand for commercial fishing facilities in the area. Regional marinas, yacht clubs, and boatyards must also be contacted

TABLE 15 BENEFIT COST RATIOS; EXCESS NET BENEFITS

PLAN	BENEFIT COST RATIO	EXCESS NET BENEFITS
Alternative 1	-	-
Alternative 2	$\frac{\$1,526,430}{\$\ 202,250} = 6.9$	$1,306,180
Alternative 3	$\frac{\$6,105,710}{\$\ 472,600} = 12.9$	$5,633,110
Alternative 4	$\frac{\$1,526,430}{\$\ 386,480} = 3.9$	$1,139,950
Alternative 5	$\frac{\$6,105,710}{\$\ 638,800} = 9.6$	$5,466,910
Alternative 6	$\frac{\$6,417,535}{\$\ 496,400} = 12.9$	$5,921,135
Alternative 7	$\frac{\$6,417,535}{\$\ 662,650} = 9.7$	$5,754,885
Alternative 8	$\frac{\$6,553,320}{\$1,566,250} = 4.2$	$4,987,070
Alternative 9		

in an attempt to determine the regional need for recreational moorings. The probable impacts on other area ports must be addressed in greater detail to ascertain that activity at Lynn Harbor will not merely represent a transfer of activity for those ports. Potential markets for the volume of underutilized fish species discussed must be sought out and analyzed. Further refinement of plans, including the selection of a disposal site for dredged material and the expense and probable use of the land area created with it, should allow the quantification of land enhancement benefits for many of the plans. The possibility of additional transportation savings through the increased shipment of commodities over the harbor must also be further explored.

IMPACT ASSESSMENT

1. Dredging Impacts. The removal of silt, sand, and gravel, to be done by either hydraulic or clamshell dredge, would have several effects on the marine environment. Turbidity in the water column would lower the amount of sunlight penetrating the water and therefore reduce rates of photosynthesis in marine flora and certain members of the plankton community. All benthic organisms in the immediate area of activity would be destroyed. Exposure of bottom sediments could result in chemical reactions within the water column and the affects would depend principally on sediment content. Possible effects include lowering the oxygen level, some suspension of heavy metals, of hydrogen sulfide, and release of other materials associated with a marine estuarine environment. Many studies on the effects of dredging have already been completed and they indicate that dredging induced turbidity and pollutant release shouldn't severely threaten the ecology of the harbor. Tidal currents in the harbor would help minimize the duration of effects associated with dredging. Further sediment analysis of the material to be removed would indicate the potential for unusual or severe of these impacts.

Some soft shell mussels are present in the mud flats in the harbor area. The impact of dredging on these mollusks could be total elimination. Many of the habitat areas of these mussels are currently contaminated (93% as previously mentioned). These mussels could be removed, purged, and subsequently relocated but the economics of this is questionable. This item will require more study in subsequent planning stages and development of the EIS.

Dredging operations would probably interfere with vessel passage in the harbor but traffic in the harbor at the present time is so low that this should not be a serious inconvenience.

As previously mentioned, no blasting is anticipated so that all impacts of blasting will be avoided.

2. Disposal Impacts. Because of the preliminary nature of this study, specific dredged material disposal sites are still being explored. As various sites are considered, each will be examined to determine the type of habitat and ascertain the need, if any, for obtaining additional lands or permits. Therefore, statements on the effects of disposal must be confined, at present, to general observations.

Potential disposal sites include, basically, four areas:

A. Land Disposal. - The most economical and readily available disposal method would be land disposal on the shores of the harbor. The 65 acre tract of land to be obtained for the industrial park would normally be ideal for this purpose. Local interests have indicated a desire for some material to be deposited over the 35 acre site that is currently the landfill area and will be utilized as a municipal park. Unless the material was deposited to a thickness of 15-20 feet, this site could not handle all the dredged material. Other local disposal sites are not available. Land disposal also assumes that all the material to be dredged is suitable for normal land disposal. This may not be the case and if fouled material were encountered, it would have to be disposed of in some acceptable manner and if toxic materials are encountered, very special techniques would be required. In any event, land disposal will have to be studied in more detail to determine the suitability of the material and the availability of sufficient disposal area.

B. Bulkhead Containment. Local interests have indicated a desire to dispose of dredged material in an area behind the breakwater contained by a bulkhead to be constructed by local interests. This would create a landmass that could be used for commercial and recreational development. An additional advantage of this method is that toxic materials could be adequately contained in that area. The initial cost of the containment bulkhead is very high and may not be exceeded by the savings when compared with dumping at sea or land disposal. In later planning stages, the details of cost, available cost sharing funds from local interests, and material suitability will make a more complete analysis possible.

C. Disposal at Sea. Another alternative would be dumping at sea which may well be the most economical plan. A disposal site does exist within 18 nautical miles of Lynn Harbor. The validity of this choice will be evaluated in a later planning stage.

D. Inland Disposal. In the event an inland site were selected, dredged materials would have to be transported to the site, probably by truck. Noise pollution, dust, damage to roads and other impacts associated with overland transportation could become important environmental factors. The severity of these factors

depends primarily on the roads travelled, therefore, discussion of these effects will be postponed until specific inland disposal sites are identified and overland routes developed.

To make a final decision on the disposal method and, in order to fully evaluate disposal impacts, a more detailed analysis must be done on the character of the material that must be disposed of, the cost of the available methods, and the necessary local assurances required.

3. Breakwater Impacts. The construction of the breakwater will impact basically on three areas; the Saugus River channel, the tidal migration of harbor material, and the harbor bottom beneath the breakwater. The breakwater has intentionally been aligned parallel to the Saugus River channel in an attempt to minimize its affects on the river. It will affect the migration of river sediments out into Lynn Harbor. Tidal migration will also be effected slightly. The effects on sediment transport will be studied in greater detail in future studies, including different type breakwaters to promote continued transport. The harbor bottom beneath the breakwater, in effect, will be totally eliminated as marine life supporting areas. The possible effects of this loss and concern for environmental impacts have been cited by the Fish and Wildlife Service (see letter, dated 25 November 1978 in Appendix 3). The impacts and possible mitigation will be discussed to much greater depth to future study.

ITEMS REQUIRING FURTHER STUDY

This project will have a significant impact on the entire harbor area and its environment. Much more site specific information is, therefore, required in order to project a realistic scenario of the harbor, both with and without project improvements. Several recommendations for Stages II and III of the study plan will provide information on the sensitivity of various environmental areas. In addition to this information, the proposed plans will be reviewed and refined in regard to their economic and engineering feasibility. Some of the more important areas needing future consideration are listed below:

.Subsurface exploration and sediment analysis of the material to be dredged to determine its suitability for various methods of disposal and to decide which type of disposal is the environmental, technical, and economic optimum.

•Survey of marine flora and fauna in the harbor, evaluation of the project's impact on them, and detailed analysis on the overall environmental impact.

•Review of alternatives to assure that all possible solutions have been considered.

•Review of study economics including:

- Verification of marine resources used.
- Verification of American capabilities in fishing for underutilized species.
- Establishment of available market for these species.
- Check of vessel availability and trends.
- Check of available labor market.
- Check with fish processors concerning their interest to expand into Lynn.
- Check on need for recreational mooring needs and desirability.
- Impacts on other regional ports.
- Establish transportation savings and land enhancement benefits.

•Refinement of alternatives for engineering and design details.

- Computation of optimum channel depth based on vessel usage anticipated, tidal sequencing, overdredged docking basins, etc.

SECTION V: STAGE II AND STAGE III PLANNING RESULTS

INTRODUCTION

This section of the report will develop a plan for making subsequent studies of economic, environmental, cultural, and sociological aspects of the requested harbor improvements and other alternatives. The development of this Reconniassance Report is incorporated in Stage I of a three stage planning process. In each stage of study, problems are identified, alternatives are formulated and impacts are assessed. Stage I is a preliminary study which established the advisability of proceeding with subsequent planning stages and establishes the procedure by which the study will be conducted. The approval of this Reconnaissance Report by the Division Engineer as required by current regulations marks the end of Stage I. Stage II studies will more fully detail and evaluate significant problems and alternatives outlined in Stage I. Stage III will completely detail the recommended plans which satisfy the multiobjective planning framework of the Principles and Standards process discussed in the following paragraphs. The end of Stage III is marked by the submission of a Feasbility Report and Environmental Impact Statement to the Board of Engineers for Rivers and Harbors and the release of a Public Announcement by the Division Engineer. These studies determine if the Federal Government can contribute assistance toward solving the problems by project construction or by implementation of other programs. Figure 13 gives a schedule of work to be completed through the end of Stage III. This schedule was developed utilizing past experience with projects of this type. Dates were evolved from normal work/review times experienced. However, due to the high preliminary B/C ratio and the tremendous local interest and initiative, all possible efforts will be made to condense the schedule and complete Stage III sooner than shown on Figure 13.

STUDY GUIDELINES

Studies will include survey report details as required by EM 1120-2-101, as amended, subject: "Survey Investigations and Reports, General Procedures." This manual incorporates the basic instructions for the planning, conducting and processing of survey reports through authorization of projects by Congress. EM 1120-2-101 as amended, provides basic information and guidance on the origin, conduct, and principles and procedures of engineering and economic investigations for civil works projects. The task of investigation requires the following items:

CALENDAR YEAR	CY 1979				CY 1980				CY 1981				CY 1982				
FISCAL YEAR	FY 1979				FY 1980				FY 1981				FY 1982				
QUARTER	2	3	4		1	2	3	4	1	2	3	4	1	2	3	4	1
	J F M A M J	J A S	O N D	J F M A M J	J A S	O N D	J F M A M J	J A S	O N D	J F M A M J	J A S	O N D	J F M A M J	J A S	O N D	J F M A M J	J A S O N D
	STAGE 1			STAGE II						STAGE III							

MILESTONE NUMBERS

MILESTONE DESCRIPTION

2 APPROVAL OF RECONN. BY D.E.

3 STAGE 2 DOCUMENTATION TO DIVISION

4 STAGE 2 CHECKPOINT CONFERENCE

5 COMPLETE ACTION ON CONF. MFR

6 DRAFT SURVEY AND DRAFT FIS TO DIVISION

7 STAGE 3 CHECKPOINT CONFERENCE

8 COMPLETE ACTION ON CONF. MFR

9 COORDINATION OF DRAFT SURVEY AND DRAFT EIS

10 SUBMISSION OF FINAL SURVEY REPORT AND REVISED DRAFT EIS TO DIVISION ENGINEER

11 RELEASE OF PUBLIC NOTICE AND SUBMISSION OF REPORT TO BERH

.01	PUBLIC INVOLVEMENT	PUBLIC MTG WORKSHOPS* PUBLIC NOTICE PUBLIC MTG WORKSHOPS* PUBLIC NOTICE PUBLIC MTG PUBLIC NOTICE
.02	INSTITUTIONAL STUDIES	
.03	SOCIAL STUDIES	STAGE II EVALUATIONS DRAFT SURVEY REPORT & DRAFT EIS FINAL SURVEY
.04	CULTURAL RESOURCE STUDIES	STAGE II EVALUATIONS DRAFT SURVEY REPORT & DRAFT EIS REPORT AND REVISED
.05	ENVIRONMENTAL STUDIES EXCEPT FISH & WILDLIFE	STAGE II EVALUATIONS DRAFT SURVEY REPORT & DRAFT EIS DRAFT EIS
.06	FISH & WILDLIFE	STAGE II REPORT DRAFT EIS
.07	ECONOMIC STUDIES	STAGE II EVALUATIONS DRAFT SURVEY REPORT & DRAFT EIS FINAL SURVEY REPORT & REVISED DRAFT EIS
.08	SURVEYING & MAPPING	HYDROGRAPHIC SURVEYS AND BORING LOCATIONS
.09	HYDROLOGY & HYDRAULICS	
.10	FOUNDATIONS & MATERIALS	BORINGS, TESTING, AND ENVIRONMENTAL SAMPLING
.11	DESIGN & COST ESTIMATES	STAGE II COSTS DRAFT SURVEY COSTS FINAL SURVEY COSTS
.12	REAL ESTATE STUDIES	
.13	STUDY MANAGEMENT	COORDINATE AND COMPILE STAGE II DOCUMENTATION COORDINATE AND ASSEMBLE DRAFT SURVEY AND DRAFT EIS COORDINATE REVISIONS TO SURVEY & DRAFT EIS
.14	PLAN FORMULATION	STAGE II PLANNING: DETAILED ALTERNATIVE COMPARISON SURVEY REPORT & EIS EVALUATION PUBLIC NOTICE
.15	REPORT PREPARATION	RECONN REPORT STAGE II DOCUMENTATION REVISE STAGE II DOCUMENTATION DRAFT SURVEY & DRAFT EIS FINAL SURVEY & REVISED DRAFT EIS
	REPORTS, MEETINGS AND ANNOUNCEMENTS	RECONNAISSANCE REPORT PUBLIC MEETING . NOTICE OF PUBLIC MEETING STAGE II DOCUMENTATION PUBLIC MEETING .NOTICE OF STAGE II PUBLIC MEETINGS DRAFT SURVEY REPORT AND DRAFT EIS FINAL SURVEY REPORT & REVISED DRAFT EIS PUBLIC MEETING .NOTICE OF PUBLIC MTG PUBLIC NOTICE OF STUDY FINDINGS

*WORKSHOPS WILL BE SCHEDULED AS NEEDED

FIGURE 13

PLANNING SCHEDULE: STAGES II & III

- Careful coordination and cooperation among all Federal and non-Federal interests concerned.
- Basic research of hydrologic and hydraulic conditions.
- Gathering and analysis of economic data.
- Deriving and comparing the relative merits of all practicable solutions for related and conflicting demands for harbor uses and site development.
- Assuring optimum use of resources and sites and securing the maximum net benefits.
- Determining the most equitable sharing of costs under the law among Federal and local interests.
- Presenting a satisfactory and adequate report on the matter for the information of all concerned and for a basis of action by Congress.

Studies will be conducted in accordance with ER 1105-2-200, "Planning Process: Multiobjective Planning Framework." This regulation establishes guidance for the implementation and planning requirements of the Water Resources Council's Principles and Standards (P&S) and related policies. It does so by describing the planning process under which alternative plans are prepared and evaluated, and by identifying the changes from the existing guidelines that are necessary as a result of the P&S and related policies. The objective of this regulation is to guide planning for the conservation, development, and management of water and related land resources. This is accomplished by systematically preparing and evaluating alternative plans that address publicly identified problems, needs, concerns and opportunities. Alternative plans will consider nonstructural and structural measures as co-equal approaches to managing resources. Through this process, decision makers at all levels will be provided information necessary to make effective choices regarding resources management under existing and projected conditions.

CONSTRAINTS AND CONTROLS

To date, this study has been funded to initiate preliminary planning and to complete a Reconnaissance Report. Studies will be continued only so long as a possibility remains that a workable, economically feasible, and environmentally and socially acceptable plan of improvement can be recommended. Based on scheduled funding, it is estimated that the Feasibility Report and Environmental Impact Statement will be completed in FY 1982.

PROCEDURES FOR SELECTION OF IMPROVEMENTS

Stage II and III studies will be conducted by formulating and analyzing alternative plans of improvement. These alternatives will be compared during the planning process by considering multiple objectives including national economic development, regional

development, environmental quality and social well-being as described in following paragraphs.

The economic feasibility of alternatives will be judged by the benefit-cost ratio method and by using the principle of maximization of benefits. Project effects that cannot be incorporated in the benefit-cost evaluation will be assessed separately in accordance with the guidelines of ER 110-5-2-105, subject: "Guidelines for Assessment of Economic, Social and Environmental Effects of Civil Works Projects," published 28 September 1972. The regulation is designed to insure that all significant adverse and beneficial effects of Corps of Engineers projects are fully considered in pre and post-authorization planning. The guidelines have been approved by the Secretary of the Army and comply with the directive of Congress contained in Section 122 of the River and Harbor and Flood Control Act of 1970, Public Law 91-611. These guidelines supplement and extend the requirements of the National Environmental Policy Act of 1969, (Public Law 91-190).

OBJECTIVES OF THE INVESTIGATION

The purpose of the feasibility study and environmental impact investigation is to determine and report to the Congress of the United States, the advisability of providing Federal assistance for navigation improvements to the Lynn Harbor waterway with regard to economic, environmental, cultural and sociological considerations. In accomplishing this goal, consideration will be given to finding solutions to immediate and long-term navigation problems and needs. In order to meet these goals, equal consideration will be given to the following objectives:

1. National Economic Development (NED)

Maintaining or increasing the value of the nation's output of goods and services as well as improving national economic efficiency, may be achieved through the development of water and related land resources. In accordance with this objective, the present and projected needs will be assessed for navigation and other elements of land and water resources development. The annual costs for this purpose will be compared against annual benefits in the interest of selecting a project based on national economic development.

2. Regional Development.

The region's income gains and the additional economic impact will be evaluated on the basis of the possible expansion of business, industry, and recreation, and on population and social developments that could result from a comprehensive plan of improvement.

3. Environmental Quality (EQ).

The preservation and enhancement of the Nation's environmental resources is essential to insure their availability for future use. The investigation will consider the preservation of natural and cultural areas, creation or restoration of scenic areas, preservation and enhancement of recreational area, and the rehabilitation and protection of aesthetic values in the study area. In accordance with the National Environmental Policy Act of 1969, all available means will be utilized to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations.

4. Social Well-Being.

The social well-being of the greatest number of people shall be an overriding consideration in determining the best use of water and related land resources. Consideration will be given to project effects on real income, security of life, health and safety, education, cultural and recreational opportunities, emergency preparedness and other factors. Hardship and basic needs of particular groups within the general public shall be of concern, but care shall be taken to avoid resource use and development for the benefit of a few to the disadvantage of many.

These objectives will be addressed in a Feasibility Report and Environmental Impact Statement. Prior to issuing these, an effects assessment will be made which will cover all environmental, social, cultural, and economic effects to insure that all significant adverse and beneficial project effects are systematically identified and assessed; and the feasibility and cost of eliminating or minimizing adverse effects is taken fully into account. Preliminary project benefits and adverse project effects on the environment, recreation, and aesthetics of the area have been made apparent by the present stage of the study.

Project decisions and recommendations will be made in the best overall interests of the public with a balance maintained between elements of dollar benefits and costs, the degree of satisfaction of public needs, and the extent of other types of effects. To accomplish this, the tentative profile of existing conditions obtained from prior studies will be augmented to show projections of conditions with and without project alternatives over the life of the project. Significant effects will be identified and evaluated. Any desirable project modifications revealed by the assessment will be considered. Survey studies will draw on all known sources of information for effects assessment.

COORDINATION

Coordination will be maintained through the Lynn Economic Development and Industrial Corporation. Each stage of the study will also be presented for comment or concurrence by other Federal, State, regional, local, and civic agencies having an interest in the planning of navigation improvements to Lynn Harbor and related land and water resources. Interests will be kept informed of planning effects and will be able to make comments and criticisms at informal workshop meetings which will be arranged when necessary. Two formal public meetings, described below, are scheduled; one during the formulation stage of the study, the other at the conclusion of the study to keep the public informed and to receive their views. Additional meetings can be arranged if the need arises.

A formulation stage public meeting will be held in the course of report preparation in order to present the advantages and disadvantages of all alternative solutions developed, and to incorporate public views and desires in selection of alternatives and plan formulation. A late stage public meeting will be held before report completion to present the findings of detailed studies, including the rationale for any proposed solution, and the tentative recommendations.

ESTIMATE OF STUDY COSTS

The preparation of budgetary data for the Lynn Harbor Study is predicated upon the estimated amount of money needed to complete the work items considered necessary for a Level C study. The total estimated funds required to complete the 3 stage study is $395,000. The distribution of funds will provide for the identification of the needs of the area under investigation by FY 1979 with the creation of alternative solutions by FY 1979, the refinement of the alternatives in FY 1979, 1980, and 1981, the selection of final alternatives by FY 1981, and the completion of the Feasibility Report by FY 1982.

SECTION VI: CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The plan presented by the Lynn Economic Development and Industrial Corporation for improvement of Lynn Harbor has been investigated along with several other development and improvement alternatives for the harbor. Several of these alternatives have been found to be worthy of further study.

Cost and benefits data have been developed for the various alternative plans. The benefit-cost ratios for the plans have been computed by comparing the annual costs and benefits over a 50 year project life. The benefit-cost ratios for the various plans show that economically justifiable plans are a distinct possibility.

If the work were performed, projected environmental conditions would not be expected to change dramatically over the project life from the projected base conditions. However, short term effects would be anticipated. Sociological conditions would change over the project life but exact changes cannot be estimated at this time. Stage II and Stage III studies would investigate these effects in more detail particularly in regard to environmental impacts of specific dredging and disposal sites.

In addition to the benefits measurable in dollars, very real benefits would be realized by the project in relation to its impact on the overall economy and living conditions of Lynn.

A detailed plan of study has been formulated to assure a systematic approach to subsequent studies and to inform all interests of scheduled study goals. Subsequent reports and meetings will be utilized to coordinate study efforts with Federal, State, and local interests.

RECOMMENDATIONS

The Division Engineer recommends that study efforts proceed with the initiation of Stage II as outlined in this report.

APPENDIX 1

APPENDIX 2

LIST OF PERSONS AND INTERESTS

TO WHOM ANNOUNCEMENTS

WERE SENT RELATIVE TO THE

INITIATION OF A NAVIGATION STUDY

FOR

LYNN HARBOR, MASSACHUSETTS

28 October 1977

CONGRESSIONAL

Honorable Edward W. Brooke
United States Senate
Washington, DC 20510

Honorable Edward W. Brooke
United States Senator
2003H JFK Federal Bldg.
Boston, MA 02203

Honorable Edward M. Kennedy
United States Senate
Washington, DC 20515

Honorable Edward M. Kennedy
United States Senator
2400A JFK Federal Bldg.
Boston, MA 02203

Honorable Michael J. Harrington
House of Representatives
Washington, DC 20515

Honorable Michael J. Harrington
Representative in Congress
Salem Post Office Bldg.
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GOVERNOR

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Governor of the Commonwealth of Mass.
State House
Boston, MA 02133 (10)

FEDERAL INTERESTS

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Resources and Civil Works Division
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Chairman
Council on Environmental Quality
722 Jackson Place, NW
Washington, DC 20006

DEPARTMENT OF AGRICULTURE

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Soil Conservation Service
U.S. Dept. of Agriculture
Washington, DC 20250 (7)

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Northeastern Area Forest Service
U.S. Department of Agriculture
6816 Market Street
Upper Darby, PA 19082 (3)

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27-29 Cottage Street
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DEPARTMENT OF COMMERCE

U.S. Maritime Administration
Dept. of Commerce
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U.S. Dept. of Commerce
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New York, NY 10007

Area Representative
Maritime Administration
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Director
Construction and Engineering Div.
Bureau of Domestic Commerce
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Washington, DC 20230

Assistant Secretary for Economic Development
Dept. of Commerce
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National Weather Service
Office of Hydrology (W2), NOAA
Dept. of Commerce
Silver Spring, MD 20910 (3)

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Eastern Region
NOAA National Weather Service
Dept. of Commerce
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Administrator
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Economic Development Adm.
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Economic Development Admin.
U.S. Dept. of Commerce
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DEPARTMENT OF DEFENSE

DEPARTMENT OF THE ARMY

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Director
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Water Resources Activity
Vector Biology & Control Div.
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Eastern Region Water Resources
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Water Resources Council
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Commission
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American Shore & Beach Preservation
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Propeller Club of the United States
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Boston, MA 02102

Outboard Boating Club of America
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American Institute of Merchant Shipping
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Honorable Frank J. Mastrocola Jr.
State Senator
State House
Boston, MA 02133

Honorable James A. Kelly Jr.
Senate Committee on Ways and
Means
State House Rm. 332
Boston, MA 02133

STATE REPRESENTATIVES

Honorable Timothy Bassett
State Representative
State House
Boston, MA 02133

Honorable Robert Phelan
State Representative
State House
Boston, MA 02133

Honorable Francis D. Doris
State Representative
State House
Boston, MA 02133

Honorable James Smith
State Representative
State House
Boston, MA 02133

Honorable Belden G. Bly Jr.
State Representative
State House
Boston, MA 02133

Honorable Angelo R. Cataldo
State Representative
State House
Boston, MA 02133

Honorable Thomas W. McGee
Speaker of the House of Representatives
State House Rm. 356
Boston, MA 02133

Honorable John J. Finnegan
House Committee on Ways and Means
State House Rm. 247
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Government Center
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Commissioner
Mass. Dept. of Public Health
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MAPC
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LOCAL OFFICIALS AND INTERESTS

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Lynn, MA 01901

Chairman Conservation Comm.
c/o City Clerk
City Hall
Lynn, MA 01901

Chairman, Comm. Devel.
Advisory Board
c/o Ann Marie Jonah
Lynn, MA 01904

Lynn City Council
c/o City Clerk
City Hall
Lynn, MA 01901

Chairman
Pinehill Civic Assoc.
c/o Clarence Robbins
2 Hillcrest Ave.
Lynn, MA 01905

Chairman
Citizens for a Better Lynn
c/o Thelma Brassard
10 Suffolk Street
Lynn, MA 01902

Exec. Director
Lynn Merchants Assoc.
31 Exchange Street
Lynn, MA 01901

Chairman Board of Selectmen
Town Hall
334 Nahant Rd.
Nahant, MA 01908

Chairman, Planning Board
Town Hall
334 Nahant Rd.
Nahant, MA 01908

Chairman, Board of Selectmen
Town Administration Bldg.
Swampscott, MA 01907

Chairman, Board of Selectmen
Town Hall
Saugus, MA 01906

Town Manager
Town Hall
Saugus, MA 01906

Revere City Council
City Hall
Revere, MA 02151

Chairman, Conservation Comm.
City Hall
Revere, MA 02151

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Lynn, MA 01905

Dr. Frederick J. Wagner
352 Lynn Fells Parkway
Saugus, MA 01906

Mrs. Polly Bradley
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Nahant, MA 01908

Exec. Director
Lynn Area Chamber of Commerce
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Lynn, MA 01901

Chairman Conservation Comm.
Town Hall
334 Nahant Rd.
Nahant, MA 01908

Chairman, Local Growth
Policy Committee
Town Hall
334 Nahant Rd.
Nahant, MA 01908

Chairman, Conservation Comm.
Town Administration Bldg.
Swampscott, Ma 01907

Chairman, Conservation Comm.
Town Hall
Saugus, MA 01906

Essex County Devel. Corp
Attn: Jonh Quigley
32 Federal Street
Salem, MA 01970

Mayor William G. Rienstein
City Hall
Revere, MA 02151

Point of Pines Comm.
Attn: Salvatore Mucci
City Hall
Revere, MA 02151

New England Power Co.
Attn: Mr. A. V. Lindquist
24 Fort Ave
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America East Corp
40 Central St.
Lynn, MA 01901

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Postmaster
Lynn, Ma 01901

Postmaster
West Lynn, MA 01905

Postmaster
East Lynn, MA 01904

Postmaster
Saugus, MA 01906

Postmaster
Swampscott, MA 01907

Postmaster
Nahant, MA 01908

Postmaster
Revere, MA 02151

MEDIA

LYNN, MASS., MEDIA LIST

Associated Press
260 Summer St.
Boston, MA 02210

Salem Evening News
155 Washington St.
Salem, MA 01970

United Press International
20 Ashburton Place
Boston, MA 02108

Beverly Times
Gloucester Times
Whittemore Street
Gloucester, MA 01930

Boston Globe
135 Morrissey Blvd.
Boston, MA 02107

Revere Journal
927 Broadway
Revere, MA 02151

Herald American
300 Harrison Ave.
Boston, MA 02118

Saugus Advertiser
55 Essex Street
Saugus, MA 01960

Lynn Item
38 Exchange Street
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Lynn Sunday Post
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WLYN
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WCVB-TV
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APPENDIX 2

LIST OF PERSONS AND INTERESTS

WHO WERE NOTIFIED

CONCERNING COMPLETION OF THE

RECONNAISSANCE REPORT

FOR

LYNN HARBOR, MASSACHUSETTS

JULY 1979

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Honorable Paul E. Tsongas
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Honorable Paul E. Tsongas
United States Senator
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Honorable Edward M. Kennedy
United States Senate
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Honorable Edward M. Kennedy
United States Senator
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Honorable Nicholas Mavroules
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Honorable Nicholas Mavroules
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99 Washington St.
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GOVERNOR

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FEDERAL INTERESTS

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Boston, MA 02114

WSBK-TV
83 Leo Birmingham Parkway
Boston, MA 02134

WCVB-TV
5 TV Place
Needham, MA 02192

WXNE-TV
100 Second Avenue
Needham Heights, MA 02194

Daily Evening Item
38 Exchange Street
Lynn, MA 01903

Daily Peabody Times
54 Main Street
Peabody, MA 01960

Danvers Herald
9 Page Street
Danvers, MA 01923

Lynn Times
8 Atlantic Street
Lynn, MA 01902

Lynnfield Villager
55 Salem Street
Lynnfield, MA 01940

W. Peabody-Lynnfield Shopper
P.O. Box 188
Lynnfield, MA 01940

Manchester Cricket
66 Summer Street
Manchester, MA 01944

Marblehead Messenger
118 Pleasant Street
Marblehead, MA 01845

Marblehead Reporter
8 Anderson Street
Marblehead, MA 01845

Saugus Town Crier
192 Central Street
Saugus, MA 01906

Swampscott Reporter
8 Anderson Street
Marblehead, MA 01945

WMLO
Box 344
Beverly, MA 01915

WNSR/WLYN
Box 631
Lynn, MA 01903

WESX
Box 710
Salem, MA 01970

APPENDIX 3

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
P. O. BOX 1518
CONCORD, NEW HAMPSHIRE 03301

September 25, 1978

Colonel John P. Chandler
Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Chandler:

This report is submitted to aid in your planning for navigation improvements at Lynn Harbor, Massachusetts. It was prepared in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and in coordination with the National Marine Fisheries Service, and the Massachusetts Divisions of Fisheries and Wildlife and Marine Fisheries. The study of the project is authorized by congressional resolutions of July 7, 1972 and October 12, 1972.

Lynn Harbor is located on the eastern coast of Massachusetts about nine miles northeast of Boston. An existing Federal channel leads from deep water in Broad Sound northward to a turning basin in the inner harbor. This channel is authorized to a 25-foot depth but has been dredged only to 22 feet. A 150-foot wide municipal channel extends southwest about 4,000 feet from the turning basin. In 1970 this channel was 13 feet deep but some shoaling has occurred. A part of the municipal channel lies parallel to, and just offshore from a bulkhead that forms the northwest shore of the harbor. This bulkhead extends about a mile and contains fill that appears to be spoil from earlier channel dredging. It is occupied by a dump that takes up a small part of the area. About 60 acres are undeveloped and are covered with reeds and a few isolated trees. This area originally was a tidal flat and salt marsh.

Preliminary plans for the project include consideration of channel construction along the bulkhead at the northwestern edge of the harbor. This channel would include most of the municipal channel. The new channel would be dredged 18 to 22 feet deep. The Federal project also would include construction of a rock jetty about 2,500 feet long extending into the harbor (eastward) from the existing bulkhead. About 13 acres of fill would be placed behind this jetty, and a turning basin would terminate the channel at this jetty. Alternate spoil sites are unspecified upland sites or ocean disposal.

The Commonwealth would dredge a small turning basin in front of the power plant. Local interests would provide other facilities as part of the proposed harbor development. A marina and commercial facilities would be placed on the fill behind the jetty. Facilities being considered on the bulkhead area include a sewage treatment plant, shipping facilities, and a fish processing plant.

A major characteristic of Lynn Harbor is the tidal flats intersected by shallow, subtidal channels. These flats are composed of fine sand and silt covered with organic sediment.

The Saugus River enters the harbor after meandering through the Saugus marshes. The Pines River joins the Saugus River less than one-half mile upstream from the harbor. These streams support some sport fishing and a number of commercial fishing boats are based there. Sportfishing and party boats also are based in Lynn Harbor. Small boat, shore-based, and pier sportfishing are common activities in the harbor proper. Sportfish species that are taken include mackerel, smelt, striped bass, winter flounder, and some bluefish. Cod are occasionally taken in deeper parts of the channel during spring months. Concentration points for shore-based sportfishing are the MDC fishing pier and the bulkhead during high tides. Lynn Harbor is a winter flounder spawning and nursery area.

A survey of sportfishing was conducted during 1975 by the Massachusetts Division of Marine Fisheries. This study was based on sampling at major points along the coast including several areas in Lynn Harbor. This survey has not been published.

The Massachusetts Division of Marine Fisheries conducted a study of the Lynn-Saugus area and published the results in 1972.[1] This report estimated that 37,718 sportfishermen using boat launching facilities, charter boats, party boats, and rental skiffs based their activities in Lynn Harbor. Thirty-one species of finfish were sampled during this study.

Shellfish found in the harbor include soft-shell clam, blue mussel, and duck clam. Taking of shellfish is prohibited due to pollution, but the area is a productive shellfish site. A recent reconnaissance revealed that there are an estimated 2,100 bushels of soft-shell clams located in a 21-acre section of the harbor in the vicinity of the bulkhead and the proposed jetty.

The harbor is the base for a number of offshore lobster fishermen and some lobsters are taken in the harbor area. Clam worms are taken commercially from the tidal flats but little is known about the extent of this fishery.

[1]Chesmore, Arthur P.; David J. Brown and Robert Anderson. 1977. A Study of the Marine Resources of Lynn-Saugus Harbor, Monograph Series No. 11, Massachusetts Department of Natural Resources, Division of Marine Fisheries.

There are four remaining major waterfowl wintering areas along the Massachusetts Coast between Cape Cod and the New Hampshire boundary. These are Parker River, Lynn Harbor, Wallaston Beach in Quincy, and Plymouth. Lynn Harbor remains attractive for wintering waterfowl because the tidal flats are extensive and productive. An estimated 400 to 600 black ducks, 200 to 300 scaup, and lesser numbers of other waterfowl such as bufflehead and Canada geese use the harbor each winter. A waterfowl banding operation is conducted here in the winter.

Lynn Harbor is an important area for sportfishing and is easily reached from major population centers. The productive shellfish resources will again be utilized when pollution is abated in the future. Adequate areas for wintering waterfowl are diminishing and Lynn remains as one of the few major areas in this part of the Commonwealth. The project investigations should include adequate analysis of these resources over the 50-year project life with and without the project. Such an analysis should include a detailed biological inventory at the sites to be directly impacted by dredging, filling, and subsequent shipping activity, and at sites outside of the direct impact areas which will be impacted by changes in the tidal currents and movement of sand and silt including possible pollutants. Possible measures to replace or mitigate the potential losses from dredging and filling should be investigated and adequate measures included in project plans.

Data from previous biological studies come from general investigations that cover a wide area. This is particularly true of the sportfishing studies. The primary thrust of proposed studies listed below is to obtain, either from existing data or field studies, information on fish and wildlife resources within the project impact area.

--Determination of sportfishing magnitude and value using existing data as a starting point.

--Determination of the magnitude of shellfish and bait worm resources in the project area.

--Analysis of waterfowl records to extract data pertinent to the impact area.

--Analysis of the benefits from a fish processing facility if it remains a part of the project.

--Exploration of possible measures to avoid or mitigate losses.

In addition to the fish and wildlife studies, a number of other investigations are needed. These include a study of tidal currents and sediment movement and the effect of the project on these currents; the magnitude and types of pollutants in the materials to be dredged; and identification of spoil sites to be used for future maintenance dredging.

We are concerned about the proposed project because losses of tidal flats in this area would be serious. A most important part of the investigation is to determine measures to replace, or mitigate if replacement is not feasible, the loss of tidal flats and the resources associated with them. We are not optimistic that replacement of tidal flats or achievement of adequate mitigation of their loss is possible with present knowledge. Therefore, the most probable position of the Service, based upon our present knowledge of the area, would be to object to construction of the jetty and filling of the area adjacent to it.

Sincerely yours,

Gordon E. Beckett
Supervisor